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DOCKET NO. 8229-014-27

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: Krishnaswamy RAMKUMAR, et al. ART UNIT: 2813
SERIAL NO.: 09/975,256 EXAMINER: David L. Hogans
FILING DATE: October 12, 2001
RCE Filed: December 11, 2003
FOR: METHOD FOR GROWING ULTRA THIN NITRIDED OXIDE

AFFIDAVIT UNDER RULE 1.132

I, Krishnaswamy RAMKUMAR, being duly sworn, do hereby depose and say as follows:

1. I am the co-inventor of the invention described in U.S. Patent Application Serial No. 09/975,256, entitled "A method for growing ultra thin nitrided oxide." I received a Masters of Technology degree in Electronics and Ph.D. in Electrical Engineering from the Indian Institute of Science, Bangalore, India. In the past 11 years, I worked as Senior Member of the Technical Staff for Cypress Semiconductor in San Jose, California. I have extensive experience in the field of electronics and am particularly skilled in the manufacture of integrated circuit devices. I serve on the International Technology Roadmap for Semiconductors' subcommittee on Front End Processes as well as on Semiconductor Industry Association's Focus Center Research Program committee to fund key research projects in universities on very advanced microelectronics research. I am a member of the Electrochemical Society, and the IEEE.

2. Chemical vapor deposition (CVD) furnaces are not designed to operate at temperatures of 850°C or above. CVD furnaces are unsuitable for performing rapid thermal nitridation (RTN), because RTN requires high temperatures (>900°C) and a rapid heating cycle that cannot be achieved with conventional CVD furnaces.

3. Silicon oxide layers produced by thermal oxidation or by CVD method have different physical properties. Thermally grown oxide layers are denser, less porous and with higher breakdown strength than oxide layers produced by the CVD method. Generally, in a method involving thermal oxide growth, the gate oxide layers are of better quality with highly controllable thickness. In addition, thermally grown oxide layers provides a better SiO₂/Si interface (Wolf and Tauber, Silicon Processing for the VLSI Era, Exhibit 1).

4. I declare that all statement made herein based on my own knowledge are true, and that all statements made herein based on information and belief are believed to be true. I further declare that these statements are made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United State Code, and that willful false statements may jeopardize the validity of the above-referenced patent application and any patent that issues therefrom.

Date: 4/9/04

Signature: Krishnaswamy

In re Wilson

(CCPA)

165 USPQ 494

Decided May 7, 1970

No. 8271

U.S. Court of Customs and Patent Appeals

Headnotes

PATENTS

1. Claims - Indefinite - In general (§ 20.551)

Construction of specification and claims - In general (§ 22.01)

All words in claim must be considered in judging patentability of claim against prior art; if no reasonably definite meaning can be ascribed to terms in claim, subject matter does not become obvious - the claim becomes indefinite.

Particular patents-Brush

Wilson, Treated Brush and Brush Treating Composition, claims 1 to 4, 8 to 10, and 15 to 21 of application allowed.

Case History and Disposition:

Page 494

Appeal from Board of Appeals of the Patent Office.

Application for patent of David W. Wilson, Serial No. 332,321, filed Nov. 5, 1963; Patent Office Group 146. From decision rejecting claims 1 to 4, 8 to 10, and 15 to 21, applicant appeals. **Reversed.**

Attorneys:

Oberlin, Maky, Donnelly & Renner, William E. Thomson, Jr., and John C. Oberlin, all of Cleveland, Ohio, for appellant.

Joseph Schimmel (Raymond E. Martin of counsel) for Commissioner of Patents.

Judge:

Before Rich, Acting Chief Judge, Almond, Baldwin, and Lane, Associate Judges, and Ford, Judge, United States Customs Court, sitting by designation.

Opinion Text

Opinion By:

Lane, Judge.

This appeal is from the decision of the Patent Office Board of Appeals, which affirmed the rejection of claims 1-4, 8-10, and 15-21 in appellant's application serial No. 332,321, filed November 5, 1963, for "Treated Brush and Brush Treating Composition." Four other claims have been allowed. We conclude that the board's decision must be reversed.

The Disclosure

Appellant's disclosure discusses certain problems in the treatment of power-driven rotary brushes. According to the disclosure, it was desirable to produce a composition for treating the brush bristles, whereby the ability of the bristles to hold abrasive particles would be enhanced. It discloses that the treatment composition should have a strength of adhesion to the brush bristles sufficiently great to prevent such composition from transferring excessively to the object being brushed; that the treatment material should wear at substantially the same rate as the brush bristles; that the material should have a high temperature softening point; and that the strength of adhesion between the treating composition and the abrasive particles must be sufficient to withstand the centrifugal force which normally would tend to throw the abrasive outwardly from the brush. The disclosure states that previously known brush-treating compositions did not accomplish all these objectives and had a tendency to dry and lose their tackiness over a period of time, thus becoming useless for holding abrasive particles on the bristles.

The disclosure states that appellant discovered that a composition having a high temperature softening point and a high degree of tackiness could be produced if a film-forming resin were blended with a tackifier resin which was incompatible with (insoluble in) the film-forming resin. The resulting composition would have two distinct phases: a continuous phase comprised of film-forming resin, either alone or saturated with a small quantity of tackifier resin, and a dispersed phase comprised of small particles of tackifier resin. The two resins may be either completely or partially incompatible, and the disclosure states that the more insoluble the resins, the greater the tack which the composition possesses. Appellant also disclosed that certain plasticizers could be added to render the resins more incompatible, thus further increasing the tack of the composition. Finally, appellant stated that the entire composition could be dissolved in a volatile solvent to allow easy application to the brush, the solvent being one which quickly evaporates upon such application.

The specification contains a list of suitable film-forming resins, including ethyl cellulose, nitro cellulose, cellulose acetate, polyvinyl acetate and cis-polyisoprene, among other materials. A list of tackifiers is given, including certain esters of abietic acid, polyvinyl ethyl ether, coumarone indene resin and terpene resins. A list of plasticizers is also given. The specification then gives four ex

amples showing how to combine various film-formers, tackifiers, plasticizers and solvents to obtain brush-treating compositions of the desired characteristics, and explains how to apply them to brushes.

The Claims

In view of the result we reach, we find that claims 1 and 8 are representative:

1. A two-phase brush treating composition having a high softening point and sufficient tack to retain abrasive material firmly adhered to brush fill material comprising a film-forming resin and a tackifier resin which is incompatible with said film-forming resin, said two phases comprising a continuous phase formed of said film-forming resin and a dispersed phase formed of small particles of tackifier resin.

8. In combination, a rotary brush having brush fill material and a two-phase pressure sensitive adhesive brush treating composition adhered thereto having a high softening point and sufficient tack to retain abrasive material firmly adhered to such brush fill material comprising a film-forming resin and a tackifier resin which is incompatible with said film-forming resin, said two phases comprising a continuous phase formed of said film-forming resin and a dispersed phase formed of small particles of tackifier resin.

The remaining claims on appeal are narrower, containing recitations of specific resins, plasticizers, etc.

The Prior Art

Grantham ¹ relates to coatings for film material and discloses a coating composition comprising a cellulose derivative film-former, a blending resin, a plasticizer, and an organic solvent. Grantham teaches that the blending agent and the film-former should be compatible.

Depew ² teaches the preparation of emulsions consisting of a continuous phase of water and a discontinuous phase of elastomer particles and particles of a volatile hydrocarbon, with vulcanizing ingredients and other additives dispersed in the hydrocarbon particles. Depew then states that where a dispersion with additional adhesive properties is desired, an adhesive, such as certain of the tackifier resins disclosed by appellants, can be added to the emulsion, and that

[t]his adhesive can be water soluble or dispersed as particles. * * * The chemistry of the adhesive component is not critical to this invention. The important thing is that the deposited film shall be tacky and adhesive.

Sergi ³ relates to adhesives suitable for installation of floor-covering products such as linoleum. Sergi's composition consists of a tackifier resin dispersed in a latex binder; the tackifier and latex must be compatible with one another, according to the Sergi disclosure.

Vaughan ⁴ teaches impregnating a fibrous buffing wheel with an aqueous emulsion consisting of a tacky resin and an emulsifier or stabilizer such as glue or gum.

The Board

The board found the composition claims to be unpatentable over Depew, Sergi or Grantham under 35 U.S.C. 103. The board reached this conclusion after noting that each of the three references shows some of the film-formers, tackifiers, plasticizers and solvents appearing in appellant's lists. The board found that the recited limitation of incompatibility was too relative a term to distinguish over the compositions of the references.

The board found that the claims to the treated brush were unpatentable, under 35 U.S.C. 103, over Vaughan in view of Sergi or Depew. Since Vaughan shows treating brushes, the board apparently considered it obvious to treat brushes with compositions which it thought were made obvious by Sergi or Depew.

The board also affirmed the rejection of certain claims for being "broader than the disclosure" under 35 U.S.C. 112. The board's basis for this rejection was that the specification did not provide adequate guidelines for making a selection among the various disclosed ingredients, nor among other materials which are not disclosed but would be included by the claims.

Opinion

We first treat the rejection under section 112. This rejection is in effect an attack on the specification as being

insufficient to teach how to practice the broad invention claimed. The rejection is therefore under the first paragraph of section 112. The board's position, as mentioned above, was that the specification did not teach how to select ingredients so that the desired incompatibility would result. We disagree with the board's position on this point. First of all, appellant provided four examples, each specifying the nature and amounts of materials to be used. Secondly,

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the record indicates that it involves only routine experimentation to find out which resins are incompatible. The examiner admitted as much when, with regard to obviousness, he said "selecting the proper tackifier and film-forming resin from those listed in the references to form an emulsion or two-phase composition would be within the expected skill of the art and would merely involve routine experimentation." We conclude that appellant has provided a sufficient specification to support the claims here in issue.

[1] Turning to the rejection of the claims for obviousness, we again disagree with the board's position. The board has disregarded the term "incompatible," as used in the claims, because it is "too relative" to distinguish over the compositions of the references. Appellant contends this limitation is essential in defining his invention. There has been no rejection here for indefiniteness, under the second paragraph of section 112. Rather than reject the claims as indefinite, the board chose to ignore the language it considered indefinite, and proceeded as though that language were not in the claims. The board said, in effect, that since we do not know what "incompatible" means, and the rest of the claim defines obvious subject matter, there is no basis for concluding unobviousness. This reasoning is incorrect. All words in a claim must be considered in judging the patentability of that claim against the prior art. If no reasonably definite meaning can be ascribed to certain terms in the claim, the subject matter does not become obvious-the claim becomes indefinite. In the present case, we think the term "incompatible" is defined with reasonable definiteness in the specification. While it is true that the word is not perfectly precise, under the circumstances of the present case there appears to be no other way for appellant to describe his discovery. In any event, the ignoring of this term by the board renders its conclusion of obviousness unsupported. None of the references discloses a two-phase composition of incompatible resins or suggests that such a composition would have the properties disclosed by appellant. Grantham and Sergi both expressly teach that the components of their compositions should be compatible. Neither Vaughan nor Depew uses a resin as the continuous phase. While Depew states, as quoted above, that the adhesive material may be dispersed as particles in the continuous phase, and hence be incompatible with the continuous phase material, it cannot be ignored that Depew's continuous phase is of water, not a film-forming resin as recited in appellant's claims. Furthermore, there is no suggestion in Depew or Vaughan that there are advantages in using an adhesive which is insoluble in the aqueous phase. There is nothing of record, therefore, from which we can properly conclude that the subject matter of appellant's claims would have been obvious at the time of his invention. The decision of the board must accordingly be *reversed*.

Footnotes

Footnote 1. U. S. Pat. 3,051,670, issued August 28, 1962.

Footnote 2. U. S. Pat. 2,933,469, issued April 19, 1960.

Footnote 3. U. S. Pat. 3,015,638, issued January 2, 1962.

Footnote 4. U. S. Pat. 2,890,136, issued June 9, 1959.

- End of Case -

FULL TEXT OF CASES (USPQ2D)

All Other Cases

In re Fine (CA FC) 5 USPQ2d 1596 (1/26/1988)

In re Fine (CA FC) 5 USPQ2d 1596

In re Fine

U.S. Court of Appeals Federal Circuit
5 USPQ2d 1596

Decided January 26, 1988

No. 87-1319

Headnotes

PATENTS

1. Patentability/Validity -- Obviousness -- Evidence of (§ 115.0903)

Patent and Trademark Office improperly rejected claimed invention for obviousness since nothing in cited references, either alone or in combination, suggests or teaches claimed invention, since there is consequently no support for PTO's conclusion that substitution of one type of detector for another in prior art system, resulting in claimed invention, would have been obvious, and since PTO therefore failed to satisfy its burden of establishing prima facie case of obviousness by showing some objective teaching or generally available knowledge that would lead one skilled in art to combine teachings of existing references.

2. Patentability/Validity -- Obviousness -- In general (§ 115.0901)

Obviousness is tested by what combined teachings of prior art references would have suggested to those of ordinary skill in art, not by whether particular combination of elements from such references might have been "obvious to try."

3. Patentability/Validity -- Obviousness -- Evidence of (§ 115.0903)

Patent and Trademark Office erred, in rejecting as obvious system for detecting and measuring minute quantities of nitrogen compounds, by failing to recognize that appealed claims can be distinguished over combination of prior art references, in view of evidence demonstrating that prior art does not teach

claimed temperature range, despite some overlap of preferred temperature ranges for claimed invention and prior art, since purposes of preferred temperature ranges are different and overlap is mere happenstance.

4. Patentability/Validity -- Obviousness -- In general (§ 115.0901)

Dependent claims are non-obvious under 35 USC 103 if claims from which they depend are non-obvious.

Case History and Disposition:

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Appeal from the U.S. Patent and Trademark Office Board of Patent Appeals and Interferences.

Application for patent by David H. Fine, Serial No. 512,374. From decision of Board of Patent Appeals and Interferences affirming rejection of application, applicant appeals. Reversed; Smith, circuit judge, dissenting with opinion.

Attorneys:

Morris Relson and Darby & Darby, New York, N.Y., (Beverly B. Goodwin with them on the brief) for appellant.

Lee E. Barrett, associate solicitor, Arlington, Va., (Joseph F. Nakamura, solicitor, and Fred E. McKelvey, deputy solicitor, with him on the brief) for appellee.

Judge:

Before Friedman, Smith, and Mayer, circuit judges.

Opinion Text

Opinion By:

Mayer, J.

David H. Fine appeals from a decision of the Board of Patent Appeals and Interferences of the United States Patent and Trademark Office (Board) affirming the rejection of certain claims of his application, Serial No. 512,374, and concluding that his invention would have been obvious to one of ordinary skill in the art and was therefore unpatentable under 35 U.S.C. §103. We reverse.

Background

A. The Invention .

The invention claimed is a system for detecting and measuring minute quantities of nitrogen compounds. According to Fine, the system has the ability to detect the presence of nitrogen compounds in quantities as minute as one part in one billion, and is an effective means to detect drugs and explosives, which emanate nitrogen compound vapors even when they are concealed in luggage and

closed containers.

The claimed invention has three major components: (1) a gas chromatograph which separates a gaseous sample into its constituent parts; (2) a converter which converts the nitrogen compound effluent output of the chromatograph into nitric oxide in a hot, oxygen-rich environment; and (3) a detector for measuring the level of nitric oxide. The claimed invention's sensitivity is achieved by combining nitric oxide with ozone to produce nitrogen dioxide which concurrently causes a detectable luminescence.

The luminescence, which is measured by a visual detector, shows the level of nitric oxide which in turn is a measure of nitrogen compounds found in the sample.

The appealed claims were rejected by the Patent and Trademark Office (PTO) under 35 U.S.C. §103. Claims 60, 63, 77 and 80 were rejected as unpatentable over Eads, Patent No. 3,650,696 (Eads) in view of Warnick, et al., Patent No. 3,746,513 (Warnick). Claims 62, 68, 69, 79, 85 and 86 were rejected as unpatentable over Eads and Warnick in view of Glass, et al., Patent No. 3,207,585 (Glass).

B. The Prior Art .

1. Eads Patent .

Eads discloses a method for separating, identifying and quantitatively monitoring sulfur compounds. The Eads system is used primarily in "air pollution control work in the scientific characterization of odors from sulfur compounds."

The problem addressed by Eads is the tendency of sulfur compounds "to adhere to or react with the surface materials of the sampling and analytical equipment, and/or react with the liquid or gaseous materials in the equipment." Because of this, the accuracy

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of measurement is impaired. To solve the problem, the Eads system collects an air sample containing sulfur compounds in a sulfur-free methanol solution. The liquid is inserted into a gas chromatograph which separates the various sulfur compounds. The compounds are next sent through a pyrolysis furnace where they are oxidized to form sulfur dioxide. Finally, the sulfur dioxide passes through a measuring device called a microcoulometer which uses titration cells to calculate the concentration of sulfur compounds in the sample.

2. Warnick Patent .

Warnick is directed to a means for detecting the quantity of pollutants in the atmosphere. By measuring the chemiluminescence of the reaction between nitric oxide and ozone, the Warnick device can detect the concentration of nitric oxide in a sample gaseous mixture.

Warnick calls for "continuously flowing" a sample gaseous mixture and a reactant containing ozone into a reaction chamber. The chemiluminescence from the resulting reaction is transmitted through a light-transmitting element to produce continuous readouts of the total amount of nitric oxide present in the sample.

3. Glass Patent.

The invention disclosed in Glass is a device for "completely burning a measured amount of a substance and analyzing the combustion products." A fixed amount of a liquid petroleum sample and oxygen are supplied to a flame. The flame is then spark-ignited, causing the sample to burn. The resulting combustion products are then collected and measured, and from this measurement the hydrogen concentration in the sample is computed.

C. The Rejection .

The Examiner rejected claims 60, 63, 77 and 80 because "substitution of the [nitric oxide] detector of Warnick for the sulfur detector of Eads would be an obvious consideration if interested in nitrogen compounds, and would yield the claimed invention." He further asserted that "Eads teaches the

[claimed] combination of chromatograph, combustion, and detection, in that order. . . . Substitution of detectors to measure any component of interest is well within the skill of the art." In rejecting claims 62, 68, 69, 79, 85 and 86, the Examiner said, "Glass et al. teach a flame conversion means followed by a detector, and substitution of the flame conversion means of Glass et al. for the furnace of Eads would be an obvious equivalent and would yield the claimed invention." The Board affirmed the Examiner's rejection.

Discussion

A. Standard of Review .

Obviousness under 35 U.S.C. §103 is " 'a legal conclusion based on factual evidence.' " *Stratoflex, Inc. v. Aeroquip Corp.* , 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed. Cir. 1983) (quoting *Stevenson v. Int'l Trade Comm'n* , 612 F.2d 546, 549, 204 USPQ 276, 279 (CCPA 1979)). Therefore, an obviousness determination is not reviewed under the clearly erroneous standard applicable to fact findings, *Raytheon Co. v. Roper Corp.* , 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed. Cir. 1983); it is "reviewed for correctness or error as a matter of law." *In re De Blauwe* , 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed. Cir. 1984).

To reach a proper conclusion under §103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of *all* the evidence, the decisionmaker must then determine whether . . . the claimed invention as a whole would have been obvious at *that* time to *that* person. 35 U.S.C. §103. The answer to that question partakes more of the nature of law than of fact, for it is an ultimate conclusion based on a foundation formed of all the probative facts.

Panduit Corp. v. Dennison Mfg. Co. , 810 F.2d 1561, 1566, 1 USPQ2d 1593, 1595-96 (Fed. Cir. 1987).

B. Prima Facie Obviousness .

Fine says the PTO has not established a *prima facie* case of obviousness. He contends the references applied by the Board and Examiner were improperly combined, using hindsight reconstruction, without evidence to support the combination and in the face of contrary teachings in the prior art. He argues that the appealed claims were rejected because the PTO thought it would have been "obvious to try" the claimed invention, an unacceptable basis for rejection.

[1] We agree. The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. See *In re Piasecki* , 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-87 (Fed. Cir. 1984). It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Lalu* , 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed. Cir. 1984); see also *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.* ,

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776 F.2d 281, 297 n.24, 227 USPQ 657, 667 n.24 (Fed. Cir. 1985); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.* , 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). This it has not done. The Board points to nothing in the cited references, either alone or in combination, suggesting or teaching Fine's invention.

The primary basis for the Board's affirmance of the Examiner's rejection was that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. The Board reiterated the Examiner's bald assertion that "substitution of one type of detector for another in the system of Eads would have been within the skill of the art," but neither of them offered any support for or explanation of this conclusion.

Eads is limited to the analysis of sulfur compounds. The particular problem addressed there is the difficulty of obtaining precise measurements of sulfur compounds because of the tendency of sulfur dioxide to adhere to or react with the sampling analytic equipment or the liquid or gaseous materials in

the equipment. It solves this problem by suggesting that the gaseous sample containing sulfur compounds be absorbed into sulfur-free methanol and then inserted into a gas chromatograph to separate the sulfur compounds.

There is no suggestion in Eads, which focuses on the unique difficulties inherent in the measurement of sulfur, to use that arrangement to detect nitrogen compounds. In fact, Eads says that the presence of nitrogen is undesirable because the concentration of the titration cell components in the sulfur detector is adversely affected by substantial amounts of nitrogen compounds in the sample. So, instead of suggesting that the system be used to detect nitrogen compounds, Eads deliberately seeks to avoid them; it warns against rather than teaches Fine's invention. See *W. L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed. Cir. 1983) (error to find obviousness where references "diverge from and teach away from the invention at hand"). In the face of this, one skilled in the art would not be expected to combine a nitrogen-related detector with the Eads system. Accordingly, there is no suggestion to combine Eads and Warnick.

Likewise, the teachings of Warnick are inconsistent with the claimed invention, to some extent. The Warnick claims are directed to a gas stream from engine exhaust "continuously flowing the gaseous mixtures into the reaction chamber" to obtain "continuous readouts" of the amount of nitric oxide in the sample. The other words, it contemplates measuring the total amount of nitric oxide in a continuously flowing gaseous mixture of unseparated nitrogen constituents. By contrast, in Fine each nitrogen compound constituent of the gaseous sample is retained in the Chromatograph for an individual time period so that each exists in discrete, time-separated pulses. *By this process, each constituent may be both identified by its position in time sequence, and measured. The claimed system, therefore, diverges from Warnick and teaches advantages not appreciated or contemplated by it.

Because neither Warnick nor Eads, alone or in combination, suggests the claimed invention, the Board erred in affirming the Examiner's conclusion that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. *ACS Hosp. Sys.*, 732 F.2d at 1575-77, 221 USPQ at 931-33. The Eads and Warnick references disclose, at most, that one skilled in the art might find it obvious to try the claimed invention. But whether a particular combination might be "obvious to try" is not a legitimate test of patentability. *In re Geiger*, 815 F.2d 868, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987); *In re Goodwin*, 576 F.2d 375, 377, 198 USPQ 1, 3 (CCPA 1978).

[2] Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so." *Id.* Here, the prior art contains none.

Instead, the Examiner relies on hindsight in reaching his obviousness determination.

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But this court has said, "To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W. L. Gore*, 721 F.2d at 1553, 220 USPQ at 312-13. It is essential that "the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made . . . to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *Id.* One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

C. Advantage Not Appreciated by the Prior Art .

[3] The Board erred not only in improperly combining the Eads and Warnick references but also in

failing to appreciate that the appealed claims can be distinguished over that combination. A material limitation of the claimed system is that the conversion to nitric oxide occur in the range of 600°C to 1700°C. The purpose of this limitation is to prevent nitrogen from other sources, such as the air, from being converted to nitric oxide and thereby distorting the measurement of nitric oxide derived from the nitrogen compounds of the sample.

The claimed nitric oxide conversion temperature is not disclosed in Warnick. Although Eads describes a preferred temperature of 675°C to 725°C, the purpose of this range is different from that of Fine. Eads requires the 675°C to 725°C range because it affords a temperature low enough to avoid formation of unwanted sulfur trioxide, yet high enough to avoid formation of unwanted sulfides. Fine's temperature range, in contrast, does not seek to avoid the formation of sulfur compounds or even nitrogen compounds. It enables the system to break down the nitrogen compounds of the sample while avoiding the destruction of background nitrogen gas. There is a partial overlap, of course, but this is mere happenstance. Because the purposes of the two temperature ranges are entirely unrelated, Eads does not teach use of the claimed range. *See In re Geiger*, 815 F.2d at 688, 2 USPQ2d at 1278. The Board erred by concluding otherwise.

D. Unexpected Results .

Because we reverse for failure to establish a *prima facie* case of obviousness, we need not reach Fine's contention that the Board failed to accord proper weight to the objective evidence of unexpected superior results. *Id.*

E. The "Flame" Claims .

[4] Claims 62, 68, 69, 79, 85 and 86 relate to the oxygen-rich flame conversion means of the claimed invention. These "flame" claims depend from either apparatus claim 60 or method claim 77. Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious. *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed. Cir. 1987); *In re Abele*, 684 F.2d 902, 910, 214 USPQ 682, 689 (CCPA 1982); *see also In re Sernaker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983). In view of our conclusion that claims 60 and 77 are nonobvious, the dependent "flame" claims are also patentable.

Conclusion

The Board's decision affirming the Examiner's rejection of claims 60, 62, 63, 68, 69, 77, 79, 80, 85 and 86 of Fine's application as unpatentable over the prior art under 35 U.S.C. §103 is *REVERSED*.

Footnotes

Footnote *. The Solicitor argues that the contents of Attachment C of Fine's brief were not before the Board and may not properly be considered here. However, we need not rely on Attachment C. It is merely illustrative of the qualitative separation of nitrogen compounds which occurs in Fine's system. The fact that the various constituents exit at discrete intervals is shown by the specification which was before the Board and which may appropriately be considered on appeal. *See, e.g., Astra-Sjuco, A.B. v. United States Int'l Trade Comm'n*, 629 F.2d 682, 686, 207 USPQ 1, 5 (CCPA 1980) (claims must be construed in light of specification).

Dissenting Opinion Text

Dissent By:

Smith, circuit judge, dissenting.

I respectfully dissent. I am of the firm belief that the prior art references, relied upon by the PTO to establish its *prima facie* case of obviousness, in combination teach and suggest Fine's invention to one

skilled in the art. Also, I firmly believe that Fine failed to rebut the PTO's prima facie case. On this basis, I would affirm the board's determination sustaining the examiner's rejection, pursuant to 35 U.S.C. §103, of Fine's claims on appeal before this court.

- End of Case -

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In re ROYKA AND MARTIN

(CCPA)

180 USPQ 580

Decided Feb. 7, 1974

No. 9092

U.S. Court of Customs and Patent Appeals

Headnotes

PATENTS

1. Patentability — Anticipation — Combining references (§ 51.205)

To support anticipation rejection, all elements of claim must be found in reference.

2. Construction of specification and claims — Broad or narrow — In general (§ 22.101)

Construction of specification and claims — By specification and drawings — In general (§ 22.251)

Claims are not read in a vacuum; while they are given broadest reasonable interpretation during prosecution, their terms still must be given meaning called for by specification of which they form a part.

3. Patentability — Anticipation — In general (§ 51.201)

Anticipation requires a finding that claimed invention be disclosed; it is not enough to say that applicants' invention and the reference are both usable for instruction and both consist of permanent and removable printings on paper.

4. Patentability — Subject matter for patent monopoly — Printed matter (§ 51.611)

It is not a valid reason for rejection that claim is merely a printed matter variation of design of reference; printed matter may very well constitute structural limitations upon which patentability can be predicated.

Particular patents—Answer System

Royka and Martin, Responsive Answer System, claims 28 and 30 to 36 of application allowed.

Case History and Disposition:

Appeal from Board of Appeals of the Patent Office.

Application for patent of Stephen F. Royka and Robert G. Martin, Serial No. 648,701, filed June 26, 1967; Patent Office Group 336. From decision rejecting claims 28 and 30 to 36, applicants appeal. Reversed.

Attorneys:

MICHAEL H. SHANAHAN, Fairport, N. Y. (THOMAS M. WEBSTER, Fairport, N. Y., and BORIS HASKELL and PARIS, HASKELL & LEVINE, both of Arlington, Va., of counsel) for appellants.

JOSEPH F. NAKAMURA (FRED W. SHERLING of counsel) for Commissioner of Patents.

Judge:

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE, and MILLER, Associate Judges.

Opinion Text

Opinion By:

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of claims 28 and 30-36 of application serial No. 648,701, filed June 26, 1967, entitled "Responsive Answer System." We reverse.

The Invention

The appealed claims are directed to a device in the nature of an answer sheet for use in self-instruction and testing. The answer sheet may be associated with questions or separate therefrom. The essential features of the invention are that there are printed on the answer sheet in "response areas" meaningful information in permanent printing and confusing information in printing which can be removed, as by an eraser, both being legible so that a student, seeing a choice of answers to a question, must make a selection. Having made a selection, he then applies an eraser to the selected response area and some of the information will be readily removed. What remains advises him of the correctness or otherwise of his answer. The following figures from the drawings are illustrative:

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Tabular, graphic, or textual material set at this point is not available. Please consult hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.

Fig. 1A shows two response areas to a given question before any removing action by the student has taken place

and Fig. 1B shows the permanent information remaining in each after erasure of the removable information. Of course, if the student makes an initial choice of area A, showing up "YES" or some other indication of a correct answer, he will not need to proceed further and erase the B area. In a modified form of the invention, a wrong selection, plus erasure, may expose, instead of or in addition to a statement that the answer is wrong, a number or other reference to further material which is to be studied.

A preferred method of printing the permanent meaningful information and the removable confusing information is by that type of xerography in which a fusible toner is used, the permanence of the printing depending on the extent to which the toner image is "fixed" or fused by heat. By successive printings of the two kinds of information with fixing to different degrees, one image can be made permanent and the other made subject to easy removal, both images retaining such similarity of appearance that the user of the answer sheet cannot tell them apart.

Claim 28 is the principal claim, all others being dependent thereon, and reads as follows:

28. A device for selectively indicating information comprising
a support having response areas for presenting information for selection,
permanent printing indicative of meaningful information permanently fixed to said support within a response area, and
removable printing indicative of confusing information removably fixed to said support within a response area,
said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,
said permanent and removable printing being substantially similar such that an observer cannot determine which information is permanent and which is removable
whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

Claims 30-36 add limitations which need not be considered except for noting that claims 33 and 34 alone specify the use of a xerographic toner, for which reason they were rejected on a different ground from the other claims.

The Rejection

The following references were relied on:

Reid et al. (Reid) 356,695 Jan. 25, 1887

Bernstein et al. (Bernstein) 3,055,117 Sep. 25, 1962

Lein et al. (Lein) 3,364,857 Jan. 23, 1968 (filed Feb. 2, 1966)

Claims 28, 30, 31, and 32 were rejected as anticipated under 35 U.S.C. 102 by Bernstein; claims 28, 31, 32, 35, and 36 were rejected as anticipated under § 102 by Reid; and claims 33 and 34 were rejected under 35 U.S.C. 103 for obviousness, on either Bernstein or Reid in view of Lein. These were the examiner's rejections and the board affirmed them, adhering to its decision on reconsideration.

Bernstein discloses an answer sheet in which printed information representing a response is "temporarily concealed from the observer" and he discloses a number of different ways of effectively concealing the response. His specification states:

The objects of the invention are accomplished by utilizing the hiding media to confuse the participant and to render the response and the hiding media indistinguishable and thus conceal the presence, absence, nature or position of the response from the participant. This may be effectuated by careful attention being paid to a number of factors including the design, color and position of the hiding or confusing media.

Fig. 1 of Bernstein's drawings illustrates some of his concealing means:

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The following is the written description:

Referring now to the drawing, FIG. 1 illustrates some of the many optically confusing patterns which may be positioned between the printed structure to be concealed and the point of observation. Column 11 shows the information which is to be concealed. This information is repeated in columns 12 through 16 but in each case is concealed by a pattern in accordance with the present invention. Column 12 utilizes a pattern comprising an alphabetical maze in both line and half tone screen. Column 13 utilizes a pattern comprising an absorbing field having a plurality of irregular dot-like interstices. Column 14 utilizes a pattern comprising a maze of plus signs combined with dots. Columns 15 and 16 illustrate irregular and non-repetitious patterns.

Bernstein says that if at least 50% of the response is actually covered by the opaque portions of the confusion pattern, complete concealment is obtained. He also says that added means of concealment may be used, such as scoring and embossing and perforating the paper in order to scatter the light or let it shine through.

Reid is entitled "Transformation Picture and Print." The invention is said to be useful for advertisements, Christmas cards, birthday cards, valentines, and the like and as a source of amusement and instruction for children. It consists of a picture or print, part of which is permanently printed and part of which is removable from the paper on which it is printed. For the latter various soluble undercoatings or inks are described. If the picture is washed with a solvent, which may be water, the removable part disappears and the pictorial and/or typographic matter changes. The invention is illustrated by a typical nineteenth century temperance propaganda piece depicting the evils of drink. In the finished picture there are three scenes from left to right: Scene 1, the innocent child leads her father home from the pub; Scene 2, Father sits slumped in the kitchen chair with his bottle beside him, the family wash hanging above his head, this picture being entitled "The Effects of Drink"; Scene 3, Mother stands in front of a sign reading "Pawn Shop." Across the bottom of the picture is a legend which says "Wash the above and see what water will do." Fig. II shows the result of washing with water: Scene 1, a handsome young man and his happy daughter stroll on the street; Scene 2, Father sits erect in a well-appointed room at a cloth-covered table, apparently having a cup of tea, obviously a gentleman; Scene 3, Mother beams from the sideline and the Pawn Shop sign has vanished. Two new subscriptions appear and the words "The" and "Drink" have disappeared, the resultant being a new picture title reading "The Beneficial Effects of Temperance." "The Beneficial" and "Temperance" were covered by some soluble opaque in the original picture. No doubt the overall effect is instruction. Perhaps there was amusement in bringing about the transformation.

Lein relates to xerography and is relied on only for its disclosure of the removability of partially fused toner and the permanence of fully fused toner.

Opinion

[1] As to the § 102 anticipation rejections, it will suffice to consider independent claim 28. If it is not fully met by Reid or Bernstein, neither are the more limited dependent claims. It is elementary that to support an anticipation rejection, all elements of the claim must be found in the reference. We do not find claim 28 anticipated by Bernstein because, as we read the claim, it requires the display of *legible* meaningful and *legible* confusing *information* simultaneously, between which the user of the device may make a selection before he undertakes to remove any of the information from the response area selected by him. The element we find most clearly missing, contrary to the reasoning of the examiner and the board, is the legible confusing *information*. The Patent Office proposes to read this limitation on Bernstein's confusion patterns which are nothing but meaningless obscuring screens, conveying no information and providing the user with no basis for making a *selection*, as called for by

claim 28. In appellants' device the legible confusing information—i.e., the wrong answers—are legible in the sense that they can be read as intelligible words, not merely a jumble of type serving to obscure the words of the wrong answers.

Appellants were fully aware of Bernstein and discussed its disclosures in their specification, distinguishing from this and other prior art, saying, in part:

The inventive concept hereof confuses not by physical blocking as taught by the prior art, but by compounding, associating (including disarranging) permanent information with confusing information, usually at least some of which is similar in character to the permanent information as to render it impossible to tell which is permanent and which is removable confusing information. In the invention, generally no attempt is made to designedly physically cover the permanent information, but to confuse it beyond interpretation by the presentation of extraneous, removable, confusing information.

[2] Claims are not to be read in a vacuum and while it is true they are to be given the broadest *reasonable* interpretation during

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prosecution, their terms still have to be given the meaning called for by the specification of which they form a part. We cannot read the terms "legible" and "information" on Bernstein's confusion patterns, as did the examiner and the board. They are not "legible," as appellants use the term, and they convey no information.

As to anticipation by Reid, we find neither appellants' basic concept nor the substance of claim 28 to be disclosed. Apparently the solicitor could find little to support the rejection in Reid for all he says in his brief—so far as claim 28 is concerned—is:

Reid discloses a sheet which may be used for instruction and which may have a removable design partly covering a fixed design * * *. Therefore, the disclosure of the reference encompasses the arrangement wherein a removable design covers a fixed design with both designs being substantially legible.

[3] But claim 28 does not call for an arrangement wherein a removable design covers a fixed design. It calls for response areas, which Reid does not have, containing meaningful information in permanent printing together with removable printing conveying confusing information, both legible at the same time, between which a "selection" can be made. The only choice offered to the user by Reid is to follow the instruction to wash the whole visible picture with water or other solvent, thus removing the overprinting, to discover what the permanent picture is. The Patent Office attempt to read claim 28 on this reference is a tour de force. We hold that Reid does not anticipate for failure to meet the limitations of claim 28 to "response areas," to the presentation of two categories of information (meaningful-permanent and removable-confusing) within such areas, and the possibility of selection. Anticipation requires a finding that the claimed invention be disclosed. It is not enough to say that appellants' invention and the reference are both usable for instruction and both consist of permanent and removable printings on paper, as did the solicitor.

The dependent claims rejected with claim 28, as anticipated under § 102, are not anticipated since claim 28 is not anticipated. Some of them merely add features which are disclosed by the references and some do not. Insofar as they do not, they further negative anticipation. The examiner recognized this fact as to claims 33 and 34, which are limited to xerography, and therefore did not reject them under § 102. Similarly, he did not reject claim 30 on Reid or claims 35 and 36 on Bernstein. We find that claims 35 and 36 contain limitations which additionally distinguish from Reid. We have already noted that Reid has no "response areas" as required by claim 28 and so Reid does not disclose the structure of claim 35 which additionally requires both the correct and incorrect answers to appear within the same response area.

[4] As to claim 36, the examiner said it "is merely a printed matter variation of the design of the reference,"

Reid. This is not a valid reason for rejection. Printed matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter in *In re Jones*, 54 CCPA 1218, 373 F.2d 1007, 153 USPQ 77 (1967); and *In re Miller*, 57 CCPA 809, 418 F.2d 1392, 164 USPQ 46 (1969), and will not repeat ourselves. The limitations of claim 36 are not remotely suggested by Reid.

There remains the § 103 rejection of claims 33 and 34. Do they, taken together with all of the limitations of claim 28 from which they depend, define obvious subject matter? The difference between claim 28 and these two dependent claims is that they add the limitations to xerography. If Bernstein and Reid showed the claimed invention except for xerography, the addition of the Lein reference would make the subject matter of the claims obvious. But that is not the situation here. Adding the knowledge of xerographic technology to Bernstein or Reid still does not make the invention of claims 33 and 34 obvious for the same reasons we have given above in discussing anticipation. The essence of appellants' invention, as set forth in claim 28, is still missing notwithstanding the addition of the Lein reference and we see nothing in the combinations of references which would have made the invention obvious to one of ordinary skill in the art at the time it was made. We will, therefore, reverse this rejection.

The decision of the board is *reversed*.

- End of Case -

FULL TEXT OF CASES (USPQ2D)

All Other Cases

Verdegaal Brothers Inc. v. Union Oil Company of California (CA FC) 2 USPQ2d 1051 (3/12/1987)

Verdegaal Brothers Inc. v. Union Oil Company of California (CA FC) 2 USPQ2d 1051

Verdegaal Brothers Inc. v. Union Oil Company of California

U.S. Court of Appeals Federal Circuit

2 USPQ2d 1051

Decided March 12, 1987

No. 86-1258

Headnotes

PATENTS

1. Patentability/Validity -- Anticipation -- Prior art (§ 115.0703)

Federal district court erred in denying patent infringement defendant's motion for judgment n.o.v., in view of evidence demonstrating that claims for making urea-sulfuric acid fertilizer, including claims that reaction be conducted in "heat sink" of recycled fertilizer to prevent high temperature buildup, were anticipated by prior art patent that specifically detailed process for making such urea-sulfuric acid products and that explicitly taught that base or "heel" of recycled fertilizer can be used to make more of product, even if patentee of prior art did not recognize that heel functioned as heat sink, since heat sink property was inherently possessed by heel.

Particular patents -- Fertilizers

4,310,343, Verdegaal and Verdegaal, Process for Making Liquid Fertilizer, holding of validity and infringement reversed.

Case History and Disposition:

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Appeal from District Court for the Eastern District of California, Coyle, J.

Action by Verdegaal Brothers Inc., William Verdegaal, and George Verdegaal, against Union Oil Company of California, and Brea Agricultural Services Inc., for patent infringement. From decision denying defendants' motion for judgment notwithstanding the verdict, defendants appeal. Reversed.

Attorneys:

Andrew J. Belansky of Christie, Parker & Hale (David A. Dillard, with him on the brief), all of Pasadena, Calif., for appellants.

John P. Sutton of Limbach, Limbach & Sutton (Michael E. Dergosits, with him on the brief), all of San Francisco, Calif., for appellees.

Judge:

Before Markey, Chief Judge, and Davis and Nies, Circuit Judges.

Opinion Text

Opinion By:

Nies, Circuit Judge.

Union Oil Company of California and Brea Agricultural Services, Inc. (collectively Union Oil) appeal from a judgment of the United States District Court for the Eastern District of California, No. CV-F-83-68 REC, entered on a jury verdict which declared U.S. Patent No. 4,310,343 ('343), owned by Verdegaal Brothers, Inc., "valid" and claims 1, 2, and 4 thereof infringed by Union Oil. Union Oil's motion for judgment notwithstanding the verdict (JNOV) was denied. We reverse.

I

BACKGROUND

The General Technology

The patent in suit relates to a process for making certain known urea-sulfuric acid liquid fertilizer products. These products are made by reacting water, urea (a nitrogen-containing chemical), and sulfuric acid (a sulfur-containing chemical) in particular proportions. The nomenclature commonly used by the fertilizer industry refers to these fertilizer products numerically according to the percentages by weight of four fertilizer constituents in the following order: nitrogen, phosphorous, potassium, and sulfur. Thus, for example, a fertilizer containing 28% nitrogen, no phosphorous or potassium, and 9% sulfur is expressed numerically as 28-0-0-9.

The Process of the '343 Patent

The process disclosed in the '343 patent involves the chemical reaction between urea

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and sulfuric acid, which is referred to as an exothermic reaction because it gives off heat. To prevent high temperature buildup, the reaction is conducted in the presence of a nonreactive, nutritive heat sink which will absorb the heat of reaction. Specifically, a previously-made batch of liquid fertilizer -- known as a "heel" -- can serve as the heat sink to which more reactants are added. Claims 1 and 2 are representative:

1. In a process for making a concentrated liquid fertilizer by reacting sulfuric acid and urea, to form an end product, the improvement comprising:
 - a. providing a non-reactive, nutritive heat sink, capable of dissipating the heat of urea and sulfuric acid, in an amount at least 5% of the end product,
 - b. adding water to the heat sink in an amount not greater than 15% of the end product,
 - c. adding urea to the mixture in an amount of at least 50% of the total weight of the end product,
 - d. adding concentrated sulfuric acid in an amount equal to at least 10% of the total weight of the end product.
2. The process of claim 1 wherein the heat sink is recycled liquid fertilizer.

Procedural History

Verdegaal brought suit against Union Oil in the United States District Court for the Eastern District of California charging that certain processes employed by Union Oil for making liquid fertilizer products infringed all claims of its '343 patent. Union Oil defended on the grounds of noninfringement and patent invalidity under 35 U.S.C. §§102, 103. The action was tried before a jury which returned a verdict consisting of answers to five questions. Pertinent here are its answers that the '343 patent was "valid" over the prior art, and that certain of Union Oil's processes infringed claims 1, 2, and 4 of the patent. None were found to infringe claims 3 or 5. Based on the jury's verdict, the district court entered judgment in favor of Verdegaal.

Having unsuccessfully moved for a directed verdict under Fed. R. Civ. P. 50(a), Union Oil timely filed a motion under Rule 50(b) for JNOV seeking a judgment that the claims of the '343 patent were invalid under sections 102 and 103. The district court denied the motion without opinion.

II

ISSUE PRESENTED

Did the district court err in denying Union Oil's motion for JNOV with respect to the validity of claims 1, 2, and 4 of the '343 patent?

III

Standard of Review

When considering a motion for JNOV a district court must: (1) consider all of the evidence; (2) in a light most favorable to the non-moving party; (3) drawing all reasonable inferences favorable to that party; (4) without determining credibility of the witnesses; and (5) without substituting its choice for that of the jury's in deciding between conflicting elements of the evidence. *Railroad Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1512-13, 220 USPQ 929, 936 (Fed. Cir.), *cert. denied*, 469 U.S. 871 [224 USPQ 520] (1984); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1546, 220 USPQ 193, 197 (Fed. Cir. 1983). A district court should grant a motion for JNOV only when it is convinced upon the record before the jury that reasonable persons could not have reached a verdict for the nonmoving party. *Railroad Dynamics*, 727 F.2d at 1513, 220 USPQ at 936; *Connell*, 722 F.2d at 1546, 220 USPQ at 197.

To reverse the district court's denial of the motion for JNOV, Union Oil must convince us that either the jury's factual findings are not supported by substantial evidence, or, if they are, that those findings cannot support the legal conclusions which necessarily were drawn by the jury in forming its verdict. See *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893, 221 USPQ 669, 673 (Fed. Cir.), *cert. denied*, 469 U.S. 857 [225 USPQ 792] (1984). *Railroad Dynamics*, 727 F.2d at 1512, 220 USPQ at 936. Substantial evidence is more than just a mere scintilla; it is such relevant evidence from the record taken as a whole as a reasonable mind might accept as adequate to support the finding under review. *Consolidated Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938); *Perkin-Elmer*, 732 F.2d at 893, 221 USPQ at 673; *SSIH Equip. S.A. v. U.S. Int'l Trade Comm'n*, 718 F.2d 365, 371 n.10, 218 USPQ 678, 684 n.10 (Fed. Cir. 1983). A trial court's denial of a motion for JNOV must stand unless the

evidence is of such quality and weight that reasonable and fair-minded persons in the exercise of impartial judgment could not reasonably return the jury's verdict. *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 758, 221 USPQ 473, 477 (Fed. Cir. 1984).

Our precedent holds that the presumption of validity afforded a U.S. patent by 35

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U.S.C. § 282 requires that the party challenging validity prove the facts establishing invalidity by clear and convincing evidence. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360, 220 USPQ 763, 770 (Fed. Cir.), *cert. denied*, 469 U.S. 821 [224 USPQ 520] (1984). Thus, the precise question to be resolved in this case is whether Union Oil's evidence is so clear and convincing that reasonable jurors could only conclude that the claims in issue were invalid. *See Perkin-Elmer*, 732 F.2d at 893, 221 USPQ at 673; *Railroad Dynamics*, 727 F.2d at 1511, 220 USPQ at 935.

Anticipation

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *See, e.g., Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 715, 223 USPQ 1264, 1270 (Fed. Cir. 1984); *Connell*, 722 F.2d at 1548, 220 USPQ at 198; *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771, 218 USPQ 781, 789 (Fed. Cir. 1983), *cert. denied*, 465 U.S. 1026 [224 USPQ 520] (1984). Union Oil asserts that the subject claims of the '343 patent are anticipated under 35 U.S.C. § 102(e) 1 by the teachings found in the original application for U.S. Patent No. 4,315,783 to Stoller, which the jury was instructed was prior art.

From the jury's verdict of patent validity, we must presume that the jury concluded that Union Oil failed to prove by clear and convincing evidence that claims 1, 2, and 4 were anticipated by the Stoller patent. *See Perkin-Elmer*, 732 F.2d at 893, 221 USPQ at 673; *Railroad Dynamics*, 727 F.2d at 1516, 220 USPQ at 939. Under the instructions of this case, this conclusion could have been reached only if the jury found that the Stoller patent did not disclose each and every element of the claimed inventions. Having reviewed the evidence, we conclude that substantial evidence does not support the jury's verdict, and, therefore, Union Oil's motion for JNOV on the grounds that the claims were anticipated should have been granted.

The Stoller patent discloses processes for making both urea-phosphoric acid and urea-sulfuric acid fertilizers. Example 8 of Stoller specifically details a process for making 30-0-0-10 urea-sulfuric acid products. There is no dispute that Example 8 meets elements b, c, and d of claim 1, specifically the steps of adding water in an amount not greater than 15% of the product, urea in an amount of at least 50% of the product, and concentrated sulfuric acid in an amount of at least 10% of the product.

Verdegaal disputes that Stoller teaches element a, the step of claim 1 of "providing a non-reactive, nutritive heat sink." As set forth in claim 2, the heat sink is recycled fertilizer. 2

The Stoller specification, beginning at column 7, line 30, discloses:

Once a batch of liquid product has been made, it can be used as a base for further manufacture. This is done by placing the liquid in a stirred vessel of appropriate size, adding urea in sufficient quantity to double the size of the finished batch, adding any water required for the formulation, and slowly adding the sulfuric acid while stirring. Leaving a heel of liquid in the vessel permits further manufacture to be conducted in a stirred fluid mass.

This portion of the Stoller specification explicitly teaches that urea and sulfuric acid can be added to recycled fertilizer, i.e., a heel or base of previously-made product. Dr. Young, Union Oil's expert, so testified. Verdegaal presented no evidence to the contrary.

Verdegaal first argues that Stoller does not anticipate because in Stoller's method sulfuric acid is added *slowly*, whereas the claimed process allows for rapid addition. However, there is no limitation in the subject claims with respect to the rate at which sulfuric acid is added, and, therefore, it is inappropriate for Verdegaal to rely on that distinction. *See SSIH*, 718 F.2d at 378, 218 USPQ at 689. It must be assumed that slow addition would not change the claimed process in any respect including the function

of the recycled material as a heat sink.

Verdegaal next argues that the testimony of Union Oil's experts with respect to what

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Stoller teaches could well have been discounted by the jury for bias. Discarding that testimony does not eliminate the reference itself as evidence or its uncontradicted disclosure that a base of recycled fertilizer in a process may be used to make more of the product.

[1] Verdegaal raises several variations of an argument, all of which focus on the failure of Stoller to explicitly identify the heel in his process as a "heat sink." In essence, Verdegaal maintains that because Stoller did not recognize the "inventive concept" that the heel functioned as a heat sink, Stoller's process cannot anticipate. This argument is wrong as a matter of fact and law. Verdegaal's own expert, Dr. Bahme, admitted that Stoller discussed the problem of high temperature caused by the exothermic reaction, and that the heel could function as a heat sink. ³ In any event, Union Oil's burden of proof was limited to establishing that Stoller disclosed the same process. It did not have the additional burden of proving that Stoller recognized the heat sink capabilities of using a heel. Even assuming Stoller did not recognize that the heel of his process functioned as a heat sink, that property was inherently possessed by the heel in his disclosed process, and, thus, his process anticipates the claimed invention. *See In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 229 (CCPA 1971). The pertinent issues are whether Stoller discloses the process of adding urea and sulfuric acid to a previously-made batch of product, and whether that base would in fact act as a heat sink. On the entirety of the record, these issues could only be resolved in the affirmative. On appeal Verdegaal improperly attempts to attack the status of the Stoller patent as prior art, stating in its brief:

Verdegaal also introduced evidence at trial that the Stoller patent is not prior art under 35 U.S.C. §§ 102 (e)/103. Professor Chisum testified that the Stoller patent, in his opinion, was not prior art. . . . This conclusion finds support in *In re Wertheim*, 646 F.2d 527 [209 USPQ 554] (CCPA 1981), and 1 Chisum on Patents §3.07[3].

Appellee Brief at 27 (record cite omitted). Seldom have we encountered such blatant distortion of the record. A question about the status of the Stoller disclosure as prior art did arise at trial. Union Oil asserted that, even though the Stoller patent issued after the '343 patent, Stoller was prior art under section 102(e) as of its filing date which was well before the filing date of Verdegaal's application. Professor Chisum never testified that the Stoller patent was *not* prior art, but rather, stated that *he did not know* whether it was prior art. An excerpt from the pertinent testimony leaves no doubt on this point: Q. (Mr. Sutton): And do you know whether the Stoller patent is prior art to the application of the Verdegaal patent?

A. (Prof. Chisum): I don't know that it is, no.

We find it even more incredible that Verdegaal would attempt to raise an issue with respect to the status of the Stoller patent given that the case was submitted to the jury with the instruction that the original Stoller patent application was prior art. ⁴ Verdegaal made no objection to that instruction below, and in its appeal briefs, the instruction is cavalierly ignored.

In sum, Verdegaal is precluded from arguing that the Stoller patent should not be considered prior art. *See* Fed. R. Civ. P. 51; *Weinar v. Rollform Inc.*, 744 F.2d 797, 808, 223 USPQ 369, 375 (Fed. Cir. 1984), *cert. denied*, 105 S.Ct. 1844 (1985); *Bio-Rad Laboratories, Inc. v. Nicolet Instrument Corp.*, 739 F.2d 604, 615, 222 USPQ 654, 662 (Fed. Cir.), *cert. denied*, 469 U.S. 1038 (1984). ⁵

After considering the record taken as a whole, we are convinced that Union Oil established anticipation of claims 1, 2, and 4 by clear and convincing evidence and that no reasonable juror could find otherwise. Consequently, the jury's verdict on validity is unsupported by substantial evidence and

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cannot stand. Thus, the district court's denial of Union Oil's motion for JNOV must be reversed.

Conclusion

Because the issues discussed above are dispositive of this case, we do not find it necessary to reach the other issues raised by Union Oil. 6 In accordance with this opinion, we reverse the portion of the judgment entered on the jury verdict upholding claims 1, 2, and 4 of the '343 patent as valid under section 102(e) and infringed.

REVERSED

Footnotes

Footnote 1. Section 102(e) provides:

A person shall be entitled to a patent unless--

....

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent

....

Footnote 2. Claim 4 is written in terms of approximate percentages of all reactants by weight of the end product. No argument is made that the process of claim 4 would result in a fertilizer product any different from that disclosed by Example 8 of Stoller.

Footnote 3. There is no dispute that the percentage of heel described in Stoller meets the percentage of heat sink required by the claims.

Footnote 4. The jury instruction read:

Stoller filed two patent applications -- an original application on October 30th, 1978, and a second on February 7th, 1980. Under the patent laws, the claims of the 343 patent are invalid if you find that the original application (Exhibit BL) anticipates the process claimed in the 343 patent.

Footnote 5. Union Oil also argues that Verdegaa's counsel misled the jury by its closing rebuttal argument:

ut I think it's important to keep in mind that [Stoller] couldn't have been a prior patent because it issued a month after the Verdegaa patent had issued.

We disapprove of Verdegaa's tactic which would form the basis for a grant of a motion for a new trial but for our conclusion that outright reversal of the ruling on the motion for JNOV is in order.

Footnote 6. It should not be inferred that all of these issues were properly before us. Union Oil appears to assume that on appeal it may dispute the resolution of any *issue* which is denominated an "issue of law" even though it was not raised in its motion for JNOV. This is incorrect. *See Railroad Dynamics*, 727 F.2d at 1511, 220 USPQ at 934.

- End of Case -

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In re Wertheim, et al.

(CCPA)

191 USPQ 90

Decided Aug. 26, 1976

No. 75-536

U.S. Court of Customs and Patent Appeals

Headnotes

PATENTS

1. Applications for patent — Continuing (§ 15.3)

Patentability — Anticipation — Carrying date back of references (§ 51.203)

Patentability — Anticipation — Patents — In general (§ 51.2211)

Specification — Sufficiency of disclosure (§ 62.7)

Claims are entitled to filing dates of parent application under 35 U.S.C. 120 and foreign application that was filed less than one year before parent application under 35 U.S.C. 119 if parent and foreign applications comply with 35 U.S.C. 112, first paragraph, including description requirement, as to claims' subject matter.

2. Foreign patents (§ 38.)

Patentability — Anticipation — Carrying date back of references (§ 51.203)

Specification — Sufficiency of disclosure (§ 62.7)

All 35 U.S.C. 119 requires is that foreign application describe and seek protection for broadly same invention as described in U.S. application claiming its benefit.

3. Court of Customs and Patent Appeals — Issues determined — In general (§ 28.201)

Court of Customs and Patent Appeals — Issues determined — Ex parte patent cases (§ 28.203)

Court of Customs and Patent Appeals, in interests of judicial economy, declines entreaty to determine whether decision's broad rule is still valid, since stated issue is dispositive regardless of decision's validity in its own factual setting; court need not separately decide sufficiency of parent U.S. application of applicants who must have benefit

of their foreign application, which contains disclosure regarding limitations that is virtually identical to parent application's, to antedate reference patent.

4. Specification — Sufficiency of disclosure (§ 62.7)

Description requirement's function is to ensure that inventor possessed, as of filing date of application relied on, specific subject matter later claimed by him, but how specification accomplishes this is not material; application need not describe claim limitations exactly, but only so clearly that persons of ordinary skill in art will recognize from disclosure that applicants invented processes including those limitations.

5. Amendments to patent application — In general (§ 13.1)

Specification — Sufficiency of disclosure (§ 62.7)

Primary consideration, in determining whether application describes claim limitations sufficiently clearly that persons of ordinary skill in art will recognize from disclosure that applicants invented processes including those limitations, is factual and depends on invention's nature and amount of knowledge imparted to those skilled in art by disclosure; broadly articulated rules are particularly inappropriate in this area; mere comparison of ranges is not enough, nor are mechanical rules substitute for analysis of each case on its facts to determine whether application conveys to those skilled in art information that applicants invented claims' subject matter; court must decide whether invention applicants seek to protect by their claims is part of invention they described as theirs in specification; fact that what applicants claim as patentable to them is less than what they describe as their invention is not conclusive if their specification also reasonably describes what they do claim; form would otherwise triumph over substance, substantially eliminating applicant's right to retreat to otherwise patentable species merely because he erroneously thought he was first with genus when he filed; patent law provides for amending claims as well as specification during prosecution, so that 35 U.S.C. 112, second paragraph, "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention" does not prohibit applicant from changing what he regards as invention, or subject matter on which he seeks patent protection, during application's pendency.

6. Patentability — Anticipation — Carrying date back of references (§ 51.203)

Pleading and practice in Patent Office — Rejections (§ 54.7)

Specification — Sufficiency of disclosure (§ 62.7)

As in cases involving section 112 enablement requirement, Patent and Trademark Office has initial burden of presenting evidence or reasons why persons skilled in art would not recognize in disclosure description of invention defined by claims; pointing to fact that claim reads on embodiments outside description's scope satisfies burden, so that applicants whose claim recites solids content range of "at least 35%" and whose foreign application described 25-60% range have burden of showing that 60% upper limit of solids content described is inherent in claim's limitation "at least 35%"; it is immaterial in ex parte prosecution whether same or similar claims were allowed to others.

7. Interference — Interference in fact (§ 41.40)

Specification — Claims as disclosure (§ 62.3)

Specification — Sufficiency of disclosure (§ 62.7)

Originally filed claim in appealed application is its own written description; disclosure of patent issued after applicants' foreign application is not evidence of what those skilled in art considered conventional at time foreign application was filed for Section 112 purposes; fact that claim's limitation is not material does not matter when limitation is copied; immateriality excuses only failure to copy patent claim's limitation.

8. Specification — Sufficiency of disclosure (§ 62.7)

There is important practical distinction between broad generic chemical compound inventions in which each compound within genus is separate embodiment of invention, and invention in which range of solids content is but one of several process parameters; broader range does not describe narrower range where broad described range pertains to different invention than narrower and subsumed claimed range.

9. Patentability — Anticipation — Carrying date back of reference (§ 51.203)**Pleading and practice in Patent Office — Rejections (§ 54.7)****Specification — Sufficiency of disclosure (§ 62.7)**

Fact that applicants' foreign application describes invention as employing solids contents within 25-60% range along with specific embodiments of 36% and 50% warrants conclusion, in context of process for making freeze-dried instant coffee from concentrated coffee, that persons skilled in art would consider claimed process employing 35-60% solids content range to be part of invention; Patent and Trademark Office's mere argument of lack of literal support is not enough; In re Lukach, 169 USPQ 795, statement that invention claimed does not have to be described in *ipsis verbis* in order to satisfy 35 U.S.C. 112 description requirement would be empty verbiage if lack of literal support alone were enough to support 35 U.S.C. 112 rejection; burden of showing that claimed invention is not described in specification rests on Patent and Trademark Office in first instance, and it is up to it to give reasons why description not in *ipsis verbis* is insufficient.

10. Amendments to patent application — New matter (§ 13.5)**Pleading and practice in Patent Office — Rejections (§ 54.7)****Specification — Sufficiency of disclosure (§ 62.7)**

New matter rejection resting on Patent and Trademark Office's conclusion that application as filed did not describe limitation is tantamount to rejection on 35 U.S.C. 112, first paragraph, description requirement.

11. Patentability — Anticipation — In general (§ 51.201)**Patentability — Invention — In general (§ 51.501)****Pleading and practice in Patent Office — Rejections (§ 54.7)**

Disclosure in prior art of any value within claimed range is anticipation of claimed range; fact that rejections are under 35 U.S.C. 103 rather than 102 requires considering whether applicants' invention and patent's disclosure are directed to different purposes and whether persons of ordinary skill in art would not look to reference patent's grandparent application for solution to problem addressed by applicants.

12. Patentability — Invention — In general (§ 51.501)

Applicants may not use rationale, that patent and its grandparent application gave no hint of inventive concept of regulating product bulk density to show unobviousness without antecedent basis for it in their application.

13. Patentability — Invention — Specific cases — In general (§ 51.5091)

It would be obvious to reduce size of coffee foam particles by suitable mechanical means to desired end product size, in process for making freeze-dried instant coffee, before, rather than after drying.

14. Patentability — Invention — In general (§ 51.501)

Applicants whose claim requires freezing over 7 to 25 minute period and who indicate that this produces coffee "having pleasant dark colour" have not overcome prima facie case of obviousness made out by reference disclosing instantaneous freezing, absent showing that only their claimed freezing time produces coffee of pleasant dark color.

15. Patentability — Invention — In general (§ 51.501)**Pleading and practice in Patent Office — Rejections (§ 54.7)****Specification — Sufficiency of disclosure (§ 62.7)**

Fact that persons skilled in art may not know how to ensure claimed final product densities from specification is pertinent only to rejection on 35 U.S.C. 112, first paragraph, enablement requirement, and not to whether limitation distinguishes prior art under Section 103.

16. Patentability — Anticipation — Patent application (§ 51.219)**Specification — In general (§ 62.1)**

Applicants' disclosure may not be used against them as prior art absent admission that matter disclosed in specification is in prior art.

17. Claims — Article defined by process of manufacture (§ 20.15)**Patentability — Invention — In general (§ 51.501)**

Court of Customs and Patent Appeals does not subscribe to broad proposition that process limitations can never serve to distinguish apparatus claims' subject matter from prior art.

18. Patentability — Anticipation — Patents — In general (§ 51.2211)

Prior art patents are to be viewed for what they disclose in their entireties and not merely for their inventive contributions to art.

19. Claims — Article defined by process of manufacture (§ 20.15)

Patentability — Invention — In general (§ 51.501)**Pleading and practice in Patent Office — Rejections (§ 54.7)**

Patentability of products defined by product-by-process claims, and not processes for making them, is what must be gauged in light of prior art; fact that some products covered by applicants' product-by-process claims may not be suggested by reference patent's grandparent application that completely discloses other subject matter embraced by applicants' claims is not relevant to patentability, complete disclosure in prior art being epitome of obviousness; fact that applicants do not contend that they could not understand basis for rejection because of Patent and Trademark Office's failure to give clear reasons for its action under 35 U.S.C. 132 and explanations given by examiner and Board of Appeals were legally ample under section warrants conclusion that claims that were allegedly improperly grouped with other claims were subject of proper rejection.

Particular patents — Drying Method

Wertheim and Mishkin, Drying Method, rejection of claims 1, 4, 6-16, 21-28, 30-35, and 40-43 affirmed; rejection of claims 2, 17-20, 29, 37, and 38 reversed; appeal dismissed as to claims 3, 5, 36, and 39.

Case History and Disposition:

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Appeal from Patent and Trademark Office Board of Appeals.

Application for patent of John H. Wertheim and Abraham R. Mishkin, Serial No. 96,285, filed Dec. 8, 1970, continuation of application, Serial No. 537,679, filed Mar. 28, 1966, claiming benefit of Swiss application filed Apr. 2, 1965. From decision rejecting claims 1, 2, 4, 6-35, 37, 38, and 40-43, applicants appeal. Modified; Baldwin and Miller, Judges, dissenting in part with opinions.

Attorneys:

William H. Vogt III, and Watson Leavenworth Kelton & Taggart, both of New York, N.Y. (Paul E. O'Donnell, Jr., New York, N.Y., of counsel) for appellants.

Joseph F. Nakamura (Gerald H. Bjorge, of counsel) for Commissioner of Patents and Trademarks.

Judge:

Before Markey, Chief Judge, and Rich, Baldwin, Lane, and Miller, Associate Judges.

Opinion Text**Opinion By:**

Rich, Judge.

This appeal is from the decision of the Patent and Trademark Office (PTO) Board of Appeals affirming the final rejection of claims 1-43, all the claims in application serial No. 96,285, filed December 8, 1970, entitled "Drying Method." ¹ The appeal on claims 3, 5, 36, and 39 has been withdrawn, and as to these claims it is, therefore, dismissed. As to the remaining claims, we affirm in part and reverse in part.

The Invention

Appellants' invention centers around a process for making freeze-dried instant coffee. Claims 1, 6, 30, and 40 are illustrative:

1. An improved process for minimising loss of volatiles during freeze-drying of coffee extract which comprises obtaining coffee extract, concentrating said extract to a higher solids level of at least 35%, foaming said concentrated extract to a substantial overrun by injection of a gas into said extract at at least atmospheric pressure to thereby avoid evaporative cooling due to evaporation of water in said extract during said foaming, freezing said foam to below its eutectic point at at least atmospheric pressure while avoiding evaporative cooling, and freeze-drying said extract at below the eutectic temperature of said extract.

6. Process for preparing a powdered coffee extract, which comprises adding sufficient inert gas to a concentrated aqueous extract of roast coffee containing about 25% to 60% by weight of soluble coffee solids to provide a foam having a density between about 0.4 and 0.8 gm/cc, freezing the foamed extract to a solid mass, grinding the frozen foam to a particle size of at least 0.25 mm and freeze drying the ground frozen foam.

30. An apparatus for carrying out the process defined in claim 6 comprising, in combination, means for foaming, a closed chamber capable of being maintained at a temperature which is substantially below the melting temperature of said frozen foam, and, disposed within said chamber, a movable endless belt, means for moving said belt at a low speed, a spreading device for distributing coffee extract foam on said belt and refrigerating means for cooling at least one surface of said belt with a liquid refrigerant.

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40. A dry coffee powder comprising a freeze-dried particulated foamed extract of roast and ground coffee, the foam before freeze drying having a density between about 0.4 and 0.8 gm/cc.

The remaining claims are reproduced in the Appendix hereto. Appellants assert that their invention produces an instant coffee having a bulk density of 0.2-0.3 gm/cc, which corresponds to that of conventional spray-dried instant coffee. ² They allege they discovered that this desired bulk density results from controlling the solids content of the concentrated extract prior to foaming and the density of the foam generated therefrom within the range of their freeze-drying process claims.

Since the claims are somewhat elliptical in setting out the steps of appellants' process, we shall describe it further. An aqueous extract of coffee is prepared by percolating hot water through roasted and ground coffee beans. The extract is concentrated to have a solids content between 25% and 60% and is then charged with gas to produce a foam having a density between 0.4 and 0.8 gm/cc. The foam is frozen and ground into particles, preferably 0.25 to 2.0 mm in size, which are freeze-dried by conventional techniques.

Prosecution History and Rejections

The claims which remain on appeal fall into two broad groups: The "interference" claims, 1, 2, 4, 37, and 38; and the "non-interference" claims, 6-35 and 40-43.

As originally filed, the application contained claims 1-5 copied from Pfluger et al. U. S. Patent No. 3,482,990 (Pfluger patent), issued December 9, 1969, on an application filed February 10, 1969. A letter under Rule 205(a), 37 CFR 1.205(a), requesting an interference with the Pfluger patent accompanied the application. By amendment,

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appellants transferred claims 6-35 from their 1966 application to the instant application. Claims 36-39, added by amendment, are modified versions of the previously copied claims and were presented for the purpose of providing a basis for phantom counts in an interference with the Pfluger patent under Rule 205(a) and Manual of Patent Examining Procedure § 1101.02. They depend from claim 2.

The patents relied on by the examiner are:

Table set at this point is not available. See table in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.

The Pfluger patent issued on a chain of four applications: serial No. 800,353, filed Feb. 10, 1969, which was a continuation of serial No. 520,347, filed Jan. 13, 1966 (Pfluger 1966), which was a continuation in-part of serial No. 309,410, filed Sept. 17, 1963 (Pfluger 1963), which was a continuation-in-part of serial No. 98,007, filed Mar. 24, 1961. The Pfluger patent discloses a process for making freeze-dried instant coffee which has as its goal minimizing the loss from a foamed extract of volatile aromatics which contribute substantially to the natural flavor of coffee and other foods.

De George describes apparatus and methods for freezing liquid, unfoamed coffee extract prior to drying on continuous belts refrigerated by brine tanks contacting the bottom surfaces of the belts. The claims of De George are directed to processes for facilitating the removal of the frozen sheet of coffee extract from the belt before it is freeze dried.

The British patent discloses a rapid freeze-drying process in which the food product is frozen, milled into small particles which are spread from a hopper in single-particle layers onto plates, and freeze-dried in a vacuum chamber. More details of the disclosure are supplied infra.

Carpenter discloses the cooling of a refrigeration belt by spraying cold brine onto the underside of the belt.

The examiner made multiple rejections which were addressed by the board in eight categories, seven of which are before us for review. Category I covers the "interference" claims, which were rejected on the Pfluger patent, claims 1, 2, and 4 under 35 USC 102 and claims 37 and 38 under § 103. The board agreed with the examiner's position that these claims were not entitled to the benefit of appellants' 1965 Swiss priority date because they were not supported by appellant's parent and Swiss applications. The limitations held to be unsupported were "at least 35% [solids content]" in claim 1, "between 35% and 60% soluble solids" in claims 2 and 4, and "pressure of less than 500 microns" and "final product

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temperature of less than 110°F." in claim 4. For that reason appellants were held to be junior to the Pfluger patent on the basis of Pfluger's 1966 filing date. In light of appellants' refusal to file a Rule 204(c) ³ affidavit showing a date of invention prior to Pfluger's 1966 filing date, the examiner and the board held the Pfluger patent to be prior art under § 102(e) against claims 1, 2, 4, 37, and 38 and rejected the claims on that basis. ⁴ The board refused to hold that the claims were supported in the parent and Swiss applications, "for interference purposes," under our decision in *In re Waymouth*, 486 F.2d 1058, 179 USPQ 627 (CCPA 1973), mod. on reh., 489 F.2d 1297, 180 USPQ 453 (CCPA 1974). The board stated that appellants' failure to file a Rule 204(c) affidavit precluded any attempt to get into an interference and that *Waymouth*, which concerned the right to make a claim for interference purposes in the application on appeal, was therefore inapplicable to this case.

Under Category II, the board affirmed the rejection of claims 6-10, 12-15, 17, and 26 under 35 USC 132 for new matter. The board held that these claims, which were added to the instant application by amendment, were not supported in the original disclosure for lack of a description of the claimed size of the ground foam particles, i.e., "at least 0.25 mm."

The Category III rejection was reversed by the board.

In Category IV, claims 6-8, 11-20, and 40-43 were rejected under § 103 on the disclosure of Pfluger 1963⁵ carried forward to the Pfluger patent, in accordance with *In re Lund*, supra. The board found that the foam density range of 0.4-0.8 gm/cc claimed by appellants (and the 0.6-0.8 gm/cc range in claims 19 and 20) was suggested by Pfluger 1963's disclosure of 0.1-0.5 gm/cc foam density and that Pfluger 1963 teaches the use of foaming gases and concentrating the coffee extract prior to foaming. The board found that the final product densities claimed would be inherent "in view of the same foam overrun density disclosed by Pfluger" and that Pfluger's example I, which discloses breaking the frozen foam strands into 3/4" lengths (i.e., "at least 0.25 mm") before drying, would suggest the size of the ground foam particles claimed by appellants.

Category V added De George to the § 103 rejection of claims 9, 10, 30, and 32-35. The board agreed with the examiner that the temperatures, foam thicknesses, and belt lengths and speeds covered by these claims are disclosed in De George, and that it would be obvious to use De George's moving belt apparatus in the Pfluger process.

In Category VI claims 21-23 and 26-29 were rejected under § 103 on Pfluger in view of the British patent, which was relied on for its teaching of the concentration of coffee extract by freezing to a solids content of 27 to 28%. Pfluger was applied to the claims under the rationale employed in Category IV.

Category VII was the rejection of claims 24 and 25 under § 103 on Pfluger, the British patent, and De George, which was relied on to show "the deposition of a coffee extract on a moving belt prior to grinding and freeze drying." The board otherwise relied on the reasoning in Categories V and VI.

Under Category VIII claim 31 was rejected on Pfluger and De George under § 103 for the reasons of Category V, with reliance on Carpenter to show refrigeration of the belt by spraying refrigerant onto the bottom of the belt instead of using De George's brine tanks.

Opinion

The "Interference" Claims — 1, 2, 4, 37, and 38

[1] The dispositive issue under this heading is whether appellants' parent and Swiss applications comply with 35 USC 112, first paragraph, including the description requirement, as to the subject matter of

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these claims. If they do, these claims are entitled to the filing dates of the parent application under 35 USC 120, *In re Lukach*, 58 CCPA 1233, 442 F.2d 967, 169 USPQ 795 (1971), and the Swiss application under 35 USC 119, *Kawai v. Metlesics*, 480 F.2d 880, 887-88, 178 USPQ 158, 164 (CCPA 1973). Since the PTO relies only on Pfluger 1966 to provide the effective U.S. filing date of the patent as a reference against these claims under §§ 102(e) and 103, a right of foreign priority in appellants' Swiss application will antedate Pfluger 1966 and remove it as prior art against the claims.

[2] The only defect asserted below in appellant's parent and Swiss application disclosures that covers all these claims is that the applications do not contain written descriptions of the solids content limitations of the concentrated extract prior to foaming, i.e., "at least 35%" (claim 1) and "between 35% and 60%" (claims 2, 4, 37, and 38).⁶

[3] Appellants' parent and Swiss applications contain virtually identical disclosures on this point. Both disclose that the coffee extract initially produced by percolation of water through ground roasted coffee is concentrated prior to foaming by suitable means "until a concentration of 25 to 60% solid matter is reached." Examples in each disclose specific embodiments having solids contents of 36% and 50%.

In our view, it is necessary to decide only whether the Swiss application complies with the description requirement of § 112 with respect to the questioned limitations. There is no question that the *instant* application supports claims 1, 2, and 4, which are original claims in that application. Appellants and the solicitor urge us to decide this case by determining whether the broad rule of *In re Waymouth*, supra, is still valid or must be

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disapproved. In the interest of judicial economy, we decline this entreaty since the issue of whether the Swiss application contains written descriptions of the disputed limitations of claims 1, 2, 4, 37, and 38, being addressed to strict compliance with § 112, first paragraph, is dispositive regardless of the validity of Waymouth in its own factual setting. The sufficiency of the parent U. S. application need not be separately decided since appellants must have the benefit of their Swiss application date to antedate the Pfluger patent.

[4] The function of the description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; how the specification accomplishes this is not material. In *re Smith*, 481 F.2d 910, 178 USPQ 620 (CCPA 1973), and cases cited therein. It is not necessary that the application describe the claim limitations exactly, In *re Lukach*, *supra*, but only so clearly that persons of ordinary skill in the art will recognize from the disclosure that appellants invented processes including those limitations. In *re Smythe*, 480 F.2d 1376, 1382, 178 USPQ 279, 284 (CCPA 1973).

[5] The primary consideration is *factual* and depends on the nature of the invention and the amount of knowledge imparted to those skilled in the art by the disclosure. The factual nature of the inquiry was emphasized in *In re Ruschig*, 54 CCPA 1551, 1558-59, 379 F.2d 990, 995-96, 154 USPQ 118, 123 (1967), which involved the question whether a broad generic disclosure "described" the single chemical compound claimed:

But looking at the problem, as we must, from the standpoint of one with no foreknowledge of the specific compound, it is our considered opinion that the board was correct in saying:

Not having been specifically named or mentioned in any manner, one is left to selection from the myriads of possibilities encompassed by the broad disclosure, with no guide indicating or directing that this particular selection should be made rather than any of the many others which could also be made.

Appellants refer to 35 USC 112 as the presumed basis for this rejection and emphasize language therein about *enabling* one skilled in the art to *make* the invention, arguing therefrom that one skilled in the art would be enabled by the specification to make chlorpropamide. We find the argument unpersuasive for two reasons. First, it presumes some motivation for

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wanting to make the compound in preference to others. While we have no doubt a person so motivated would be enabled by the specification to make it, this is beside the point for the question is not whether he would be so enabled but whether the specification discloses the compound to him, specifically, as something appellants actually invented. We think it does not. Second, we doubt that the rejection is truly based on section 112, at least on the parts relied on by appellants. If based on section 112, it is on the requirement thereof that "The specification shall contain a written description *of the invention* * * *." [Emphasis ours.] We have a specification which describes appellants' invention. The issue here is in no wise a question of its compliance with section 112, it is a question of *fact*: *Is the compound of claim 13 described therein?* Does the specification convey clearly to those skilled in the art, to whom it is addressed, in any way, the information that appellants invented that specific compound?

Broadly articulated rules are particularly inappropriate in this area. See, e.g., *In re Smith*, 59 CCPA 1025, 1033, 458 F.2d 1389, 1394, 173 USPQ 679, 683 (1972), in which this court felt obliged to overrule a supposed "rule" of *In re Risse*, 54 CCPA 1495, 1500-01, 378 F.2d 948, 952-53, 154 USPQ 1, 5 (1967). Mere comparison of ranges is not enough, nor are mechanical rules a substitute for an analysis of each case on its facts to determine whether an application conveys to those skilled in the art the information that the applicant invented the subject matter of the claims. In other words, we must decide whether the invention appellants seek to protect by their claims is part of the invention that appellants have described *as theirs* in the specification. That what appellants claim as patentable to them is *less* than what they describe as their invention is not conclusive if their specification also reasonably

describes that which they do claim. Inventions are constantly made which turn out not to be patentable, and applicants frequently discover during the course of prosecution that only a part of what they invented and originally claimed is patentable. As we said in a different context in *In re Saunders*, 58 CCPA 1316, 1327, 444 F.2d 599, 607, 170 USPQ 213, 220 (1971):

To rule otherwise would let form triumph over substance, substantially eliminating the right of an applicant to retreat to an otherwise patentable species merely because he erroneously thought he was first with the genus when he filed. Cf. *In re Ruff*, 45 CCPA 1037, 1049, 256 F.2d 590, 597, 118 USPQ 340, 347 (1958). Since the patent law provides for the amendment during prosecution of *claims*, as well as the specification supporting claims, 35 USC 132, it is clear that the reference to "particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention" in the second paragraph of 35 USC 112 does not prohibit the applicant from changing what he "regards as his invention" (i.e., the subject matter on which he seeks patent protection) during the pendency of his application. Cf. *In re Brower*, 58 CCPA 724, [728] 433 F.2d 813, 817, 167 USPQ 684, 687 (1970) (fact that claims in continuation application were directed to subject matter which appellants had not regarded as part of their invention when the parent application was filed held not to prevent the continuation application from receiving benefit of parent's date).

[6] Claims 1 and 4 present little difficulty. Claim 1 recites a solids content range of "at least 35%," which reads literally on embodiments employing solids contents outside the 25-60% range described in the Swiss application. As in cases involving the enablement requirement of § 112, e.g., *In re Armbruster*, 512 F.2d 676, 185 USPQ 152 (CCPA 1975), we are of the opinion that the PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims. By pointing to the fact that claim 1 reads on embodiments outside the scope of the description, the PTO has satisfied its burden. Appellants thus have the burden of showing that the upper limit of solids content described, i.e., 60%, is inherent in "at least 35%," as that limitation appears in claim 1. Appellants have adduced no evidence to carry this burden as to claim 1, and they argue only that since the Pfluger patent contains claim 1 supported by Pfluger's disclosure with a stated upper limit of 60%, like appellants' Swiss disclosure, refusal to grant appellants claim 1 amounts to an illegal reexamination of claim 1 in Pfluger. However, as we have often repeated, as recently as *In re Giolito*, 530 F.2d 397, 188 USPQ 645 (CCPA 1976), it is immaterial in *ex parte* prosecution whether the same or similar claims have been allowed to others.

[7] Claim 4 contains the additional limitations, relating to the "final product temperature" and the pressure at which the frozen foam is vacuum freeze-dried, of "less

than 100°F. and "less than 500 microns." "Final product temperature," it appears, refers to the temperature at which so-called bound water is driven off from the product by heating after the vacuum drying phase has ended. We find no description of final product temperature in appellants' Swiss application. It is not disputed that appellants do not expressly disclose final product temperatures or this secondary drying step. They again appeal, however, to the Pfluger patent disclosure and to an amendment entered in the application on appeal (not objected to as new matter by the examiner) to show that final product temperatures are conventional in the art and need not be expressly disclosed. The amendment is clearly irrelevant since claim 4, an originally filed claim, is its own written description in the appealed application. *In re Gardner*, 475 F.2d 1389, 177 USPQ 396, rehearing denied, 480 F.2d 879, 178 USPQ 149 (CCPA 1973). The issue is whether the Swiss application describes the claimed final product temperature, not whether the instant application does so. The Pfluger patent disclosure is also unavailable to appellants. The Swiss application was filed before Pfluger issued, which means that for the purposes of § 112 the Pfluger disclosure is not evidence of what those skilled in the art considered conventional at the time the Swiss

application was filed. In re Glass, 492 F.2d 1228, 181 USPQ 31 (CCPA 1974).⁷

Claims 1 and 4, therefore, are not entitled to the benefit of the filing date of appellants' Swiss application.

[8] Claims 2, 37, and 38, which claim a solids content range of "between 35% and 60%," present a different question. They clearly claim a range *within* the described broad range of 25% to 60% solids; the question is whether, *on the facts*, the PTO has presented sufficient reason to doubt that the broader described range also describes the somewhat narrower claimed range. We note that there is no evidence, and the PTO does not contend otherwise, that there is in fact any distinction, in terms of the operability of appellants' process or of the achieving of any desired result, between the claimed lower limit of solids content and that disclosed in the Swiss application. We see an important practical distinction between broad generic *chemical compound* inventions, for example, as in In re Ruschig, *supra*, in which each compound within the genus is a separate embodiment of the invention, and inventions like that at bar, in which the range of solids content is but one of several process parameters. What those skilled in the art would expect from using 34% solids content in the concentrated extract prior to foaming instead of 35% is a different matter from what those skilled in the art would expect from the next adjacent homolog of a compound whose properties are disclosed in the specification. We wish to make it clear that we are not creating a rule applicable to all description requirement cases involving ranges. Where it is clear, for instance, that the broad described range pertains to a different invention than the narrower (and subsumed) claimed range, then the broader range does not describe the narrower range. In re Baird, 52 CCPA 1747, 348 F.2d 974, 146 USPQ 579 (1965); In re Draeger, 32 CCPA 1217, 150 F.2d 572, 66 USPQ 247 (1945).

[9] In the context of *this* invention, in light of the description of the invention as employing solids contents within the range of 25-60% along with specific embodiments of 36% and 50%, we are of the opinion that, as a factual matter, persons skilled in the art would consider processes employing a 35-60% solids content range to be part of appellants' invention and would be led by the Swiss disclosure so to conclude. Cf. In re Ruschig, *supra*. The PTO has done nothing more than to argue lack of literal support, which is not enough. If lack of literal support alone were enough to support a rejection under § 112, then the statement of In re Lukach, *supra*, 58 CCPA at 1235, 442 F.2d at 969, 169 USPQ at 796, that "the invention claimed does not have to be described in *ipsis verbis* in order to satisfy the description requirement of § 112," is empty verbiage. The burden of showing that the claimed invention is not described in the specification rests on the PTO in the first instance, and it is up to the PTO to give reasons why a description not in *ipsis verbis* is insufficient.

We conclude, therefore, that claims 2, 37, and 38 are entitled to the benefit of the filing date of appellants' Swiss application.

Since the Pfluger patent is not available as prior art as of its 1966 date under §§ 102(e) and 103 against claims 2, 37, and 38, the rejection of those claims is reversed. The rejection of claims 1 and 4 is affirmed. Appellants filed no affidavit under Rule 204(c) showing a date of invention for claims 1 and 4 prior

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to Pfluger's 1966 filing date, In re Gemassmer, 51 CCPA 726, 319 F.2d 539, 138 USPQ 229 (1963), and have not antedated Pfluger as to those claims under 35 USC 119 and 120.

The New Matter Rejection

[10] The issue to be decided here is whether the limitation appearing in claim 6, carried forward into the other claims affected by this rejection, that the frozen foam be ground "to a particle size of at least 0.25 mm" before it is dried, was added to the instant application in violation of 35 USC 132. This new matter rejection rests on a finding by the PTO that the application as filed did not describe this limitation. Thus, the converse of what we said in In re Bowen, 492 F.2d 859, 864, 181 USPQ 48, 52 (CCPA 1974), is true in this case, namely, that this new matter rejection is tantamount to a rejection of the claims on the description requirement of 35 USC 112, first paragraph. The solicitor agrees with this.

We conclude that the originally filed specification clearly conveys to those of ordinary skill in the art that appellants invented processes in which the frozen foam is ground to a particle size of "at least 0.25 mm," and not, as the PTO asserts, only processes in which the particle sizes are no larger than 2 mm. See *In re Smythe*, supra.

The specification states, *inter alia* (emphasis ours):

At the end of the [cooling] belt the extract is removed as a continuous rigid sheet which *may* then be broken up into fragments suitable for grinding. These fragments *may, for example*, be ground to a particle size which is *preferably* within the range 0.25 to 2.0 mm.

In a modification of the process, the frozen extract may be freeze-dried in the form of *plates or lumps* which are *subsequently* ground to the desired particle size.

The examples speak of drying frozen ground particles of sizes between 0.1 and 2 mm. While the specification indicates that the 0.25 to 2.0 mm range is preferred, we think it clearly indicates that, as an alternative embodiment of appellants' invention, the foam may be dried in lumps or plates of undisclosed size, which are reduced to the obviously smaller preferred particle size by grinding only *after* being dried. The solicitor argues that the claimed "range" has no upper limit, wherefore it is not disclosed. The clear implication of this disclosed modification is that appellants' specification does describe as their invention processes in which particle size is "at least 0.25 mm," without upper limit, as delineated by the rejected claims. The rejection of claims 6-10, 12-15, 17, and 26 under 35 USC 132 is reversed.

The "Non-Interference" Claims — 6-35 and 40-43

In the Examiner's Answer, appellants were granted the benefit of the filing date of their Swiss application for claims 16-25, 27-35, and 40-43. The examiner stated: "Claims 6-15 and 26, except for new matter, would otherwise be supported in the Swiss application." Our reversal of the new matter rejection eliminates the basis for the examiner's refusal to give claims 6-15 and 26 the benefit of appellants' Swiss filing date. Appellants' parent and Swiss applications contain the same disclosures concerning particle size as does the application on appeal, and we shall treat all the claims under this heading as entitled to the right of foreign priority claimed by appellants.

Our analysis of these claims will be broken down by the type of claim involved, i.e., process, apparatus, and product, and not as the board addressed them. In each discussion we will apply as prior art under § 102(e) only those portions of the Pfluger patent disclosure that were carried forward from the Pfluger 1963 application (Pfluger 1963) through the two subsequent applications into the patent, as did the board. *In re Lund*, supra.

A. Process Claims 6-14 and 16-29

There are four independent process claims: claims 6, from which claims 7-14, 16, and 17 depend; claim 18; claim 19, from which claim 20 depends; and claim 21, from which claims 22-29 depend.

Pfluger 1963 contains the following disclosure, which, in substance, is carried forward into the patent:

This invention is founded on the discovery that an aqueous aromatic liquid containing solids in suspension and solution may be dried without undergoing loss of aromatic volatiles by a process which comprises foaming the aqueous liquid to a substantial overrun while avoiding evaporation of said aqueous liquid, freezing said foam to below its eutectic point while avoiding evaporation of the aqueous liquid, subliming said aqueous liquid from the frozen foam to reduce the moisture of the foam to at least 10-20%, and further drying the foam to a stable moisture content.

In many applications such foaming can be considerably increased by concentrating the solution or suspension to a relatively high solids content prior to incorporation of air or other gas such as nitrogen therein by first whipping and then freezing the foam, preferably by conductive freezing. During the foaming step, it is essential in order to prevent loss of volatiles to avoid any evaporative cooling of the

material, i.e., evaporation of water during the foaming step. Also, during the freezing step evaporative cooling should be avoided. Other ways for creating a frozen foam without undergoing evaporative cooling involve the overt introduction to a solution or suspension of dry ice, i.e., solid carbon dioxide in a suitably ground or particulate form, whereby carbon dioxide gas is liberated upon subliming of the "dry ice" to cause foaming of the solution or suspension to occur. Similarly, refrigerated air or nitrogen can be introduced to the solution or suspension to cause freezing thereof incident to foaming the material. The foam preferably has a high overrun whereby the density of the solution or suspension is changed from above 1.0 gm./cc. to between 0.1-0.5 gms/cc.

Example I, the sole disclosed embodiment in which the foam density is given, shows foaming the extract to a density of 0.22 gm/cc.

Claims 19 and 20 recite a foam density of "between about 0.6 and about 0.8 gm/cc," outside the range disclosed by Pfluger 1963. The examiner's position was that Pfluger's disclosure of 0.5 gm/cc as an upper density limit suggests "about 0.6 gm/cc" as the lower limit in the processes of claims 19 and 20 "in the absence of a critical difference between them." We see no such suggestion. By preferring a high foam overrun, i.e., lower rather than higher foam densities, Pfluger 1963 teaches away from employing higher foam densities than its disclosed upper limit of 0.5 gm/cc. Appellants' "about 0.6 gm/cc" lower limit is sufficiently precise to describe foam densities above 0.5 gm/cc and thus outside the range of foam densities that persons of ordinary skill in the art would have been motivated to use by Pfluger 1963's disclosure of a preference for high overrun foams no denser than 0.5 gm/cc. The examiner's comment about the lack of a showing of a critical difference is based on his failure to appreciate that Pfluger 1963 teaches away from increasing foam density. The rejection of claims 19 and 20 under § 103 is reversed.

[11] Claims 6-14, 16, 17, and 21-29 recite foam density ranges of "between about 0.4 and 0.8 gm/cc" and solids contents in the range of "about 25% to 60%." Claims 6-10, 12-14, 17, and 26 recite particle sizes of "at least 0.25 mm," claims 16 and 27 say "about 0.25 to 2 mm," claims 11 and 28 recite particle sizes "approximately equal to that of roast and ground coffee," and claims 21-25 do not mention particle size. Pfluger 1963's disclosed foam density range of 0.1-0.5 gm/cc covers values within the scope of all the above-listed claims; the solids contents disclosed in Pfluger 1963 Examples I (27%) and V (30%) are within the claimed ranges of 25-60%. Pfluger 1963 clearly teaches a process for making instant coffee comprising the steps of preparing and concentrating aqueous coffee extract, foaming the extract then freezing the foam, and drying the frozen foam, in that order. Pfluger 1963 teaches fragmenting the frozen foam into ¾-inch pieces before drying; ¾ inch is, of course, "at least 0.25 mm." Of course, the disclosure in the prior art of any value within a claimed range is an anticipation of the claimed range. We appreciate the arguments made in *In re Malagari*, 499 F.2d 1297, 182 USPQ 549 (CCPA 1974), and the discussion in *In re Orfeo*, 58 CCPA 1123, 440 F.2d 439, 169 USPQ 487 (1971), to the effect that ranges which overlap or lie inside ranges disclosed by the prior art may be patentable if the applicant can show criticality in the claimed range by evidence of unexpected results. The rejections here are under § 103, not § 102, which requires us to consider appellants' argument that their invention and Pfluger's disclosure are directed to different purposes and that persons of ordinary skill in the art would not look to Pfluger 1963 for a solution to the problem addressed by appellants. See *In re Orfeo*, supra.

[12] Appellants' contentions were thus stated in their main brief:

The Board erred at the threshold in failing to appreciate that neither the Pfluger patent nor the 1963 Pfluger application gives any inkling or hint of the inventive concept underlying the rejected claims. * * * The Pfluger disclosures make no mention of product bulk density and contain no suggestion of altering or regulating that density in any manner. Neither does the reference suggest appellants' step of grinding the foam before freeze drying.

One of ordinary skill in the art reading the 1963 Pfluger disclosure would have no

inkling of the problem addressed and solved by appellants; and one looking for ways to meet that problem would have no occasion to consider Pfluger or his expedients.

Without an antecedent basis for it in their application, appellants may not use this rationale to show unobviousness. In *re Davies*, 475 F.2d 667, 177 USPQ 381 (CCPA 1973). While appellants do disclose what the bulk density of their product "usually" is, we find no suggestion in appellants' application that their invention is addressed to the regulation of the bulk density of the product, and the claims make no express reference to such regulation. The only references in appellants' disclosure to this alleged problem and its solution which are apparent to us are (emphasis ours):

After freeze-drying, the coffee extract is obtained in the form of a powder the density of which is *usually* 0.2 to 0.3 gm/cc.

Drying of the concentrated extract should *desirably* be carried out *under controlled conditions* such that the finished product possesses an appropriate *density* and colour. * * *

* * * The conditions of freezing, notably belt speed, freezing temperature, thickness of foam layer as well as the *density of the foam*, are factors which have an important *influence* on the *colour* of the finished product and should therefore be carefully controlled.

The inadequacy of this disclosure is evident. There is no mention of *regulating* the final product density or of controlling solids content. We therefore see no basis for depreciating Pfluger as evidence of the scope and content of the prior art, as well as of the level of ordinary skill in this art, as appellants would have us do. Nor is there any factual basis for concluding that the ranges claimed by appellants are critical in themselves to their alleged inventive contribution.

[13] We find no error in the rejection under § 103 of claims 6-14, 16, and 21-28, which recite no final product density. The only difference between claims 6, 12-14, and 16 and the Pfluger 1963 disclosure upon which appellants rely to show the unobviousness of the subject matter of the claims (and which does not relate to solids content or foam density) is the step of "grinding the frozen foam to a particle size of at least 0.25 mm" *prior* to freeze-drying. ⁸ Pfluger 1963, appellants assert, "fragments" the frozen foam prior to drying and "grinds" the foam only after it has been dried. As indicated above, the size of the fragments of frozen foam disclosed by Pfluger 1963 is "at least 0.25 mm." We do not think this difference shows the subject matter to be unobvious. Pfluger 1963 implies that the sizes of foam particles before and after drying are comparable; it would have been obvious to reduce the size of the foam particles by suitable mechanical means, whether it be called fragmenting or grinding, to the desired end product size before rather than after drying. Claim 11 differs only in its recitation of final product particle size, which Pfluger 1963 shows is an obvious matter of choice for those of ordinary skill in the art, who know how large ground roasted coffee bean particles are. The commercial motivation for making the particles this size is obvious. Appellants have not argued the patentability separately from claim 6 of claims 9 and 10, which add temperature and foam thickness limitations suggested by Pfluger and De George, as discussed *infra* in considering claims 24 and 25.

[14] Claim 8 likewise recites no final product density, but it requires that the freezing of the foam take place over a period of 7 to 25 minutes, which, appellants' application indicates, produces instant coffee "having a pleasant dark colour." Pfluger 1963 discloses freezing in liquid nitrogen or liquid air, which would be instantaneous, or rapid freezing on a belt, and states further, "The foam may be frozen at a high or a more gradual rate *without any apparent difference* in the utility thereof insofar as freeze drying is concerned * * *." (Emphasis ours.) Appellants have not shown that only their claimed freezing time produces coffee with a pleasant dark color. Thus, they have not overcome the *prima facie* case of obviousness made out by Pfluger 1963.

In light of appellants' concession in the amendment in which they added claims 37-39 that freeze concentration was known in the art, the rejection of claims 21-23, and 26-28 under Category VI, *supra*, becomes little more than

a rejection on Pfluger 1963 alone. With the exception of freeze concentration, which is disclosed by the British patent, every element of claim 21 is disclosed by Pfluger 1963, as indicated supra. Appellants advance no arguments for the patentability of claim 21 different from those

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we have already rejected for claim 6. Claim 22 adds only a recitation of the inert gases used in the foaming step, which were known in the prior art. Claims 26-28 recite the particle sizes of claims 6, 16, and 11, respectively; these particle sizes are not sufficient to show unobviousness for the reasons given supra. Claim 23, which was also rejected under Category VI, recites the freezing time of claim 8. It is unpatentable for the same reasons given for claim 8, supra.

Claims 24 and 25, to which Pfluger 1963, De George, and the British patent were applied under § 103, call for the temperature and foam limitations already discussed under claims 9 and 10, supra. Temperature and foam thickness within the claimed ranges are disclosed by Pfluger 1963 in Example VI (freezing foam at — 30°F. on a belt and subsequently loading foam onto trays to a 1-inch (approx. 25mm) depth for vacuum drying). Appellants do not allege that the ranges of claims 24 and 25 are critical.

[15] Claims 17, 18, and 29, on the other hand, recite the bulk density of the final product made by each process in positive terms. The board dismissed these final product density limitations as being merely recitations of the inherent result of observing the foam density and solids content ranges set forth in these claims. Although we found above that appellants' specification as filed does not disclose regulating product density by controlling the foam density and solids content in the process and that claims which failed to recite controlled product density could not rely on this feature to distinguish over the prior art under § 103, these claims do require such regulation or control, by implication through their express recitation of the density of the final product to be obtained from the processes they delimit. That persons skilled in the art may not know how to ensure the claimed final product densities from the specification is pertinent only to a rejection on the enablement requirement of § 112, first paragraph, which is not before us. The only question here is whether the subject matter of claims 17, 18, and 29, the scope of which is unquestionably clear, is obvious under § 103.

[16] Pfluger 1963 discloses no final product densities and contains no teaching on how to achieve any particular final product density from practicing its process. The inherency of final product density adverted to by the board can be gleaned only from appellants' disclosure, if anywhere, which may not be used against them as prior art absent some admission that matter disclosed in the specification is in the prior art. In *re Kuehl*, 475 F.2d 658, 177 USPQ 250 (CCPA 1973); cf. In *re Nomiya*, 509 F.2d 566, 184 USPQ 607 (CCPA 1975). In the absence of disclosure of final product densities or how to achieve any desired density in the prior art applied by the PTO to claims 17, 18, and 29, we cannot say that the subject matter of these claims would have been obvious to persons of ordinary skill in the art.

The rejection of process claims 6-14, 16, and 21-28 is affirmed; the rejection of claims 17-20, and 29 is reversed.

B. Apparatus Claims 30-35

[17] The preamble of independent claim 30, carried forward into claims 31-35, recites that the apparatus is "for carrying out the process in claim 6." Appellants contend that this preamble gives "life and meaning" to the claims, serving to define the interrelationship of the mechanical elements recited in the body of the claims. This argument appears to be based on *Kropa v. Robie*, 38 CCPA 858, 187 F.2d 150, 88 USPQ 478 (1951), the classic case in this court on the construction of claim preambles. In *Kropa* the court surveyed prior cases and said 38 CCPA at 861, 187 F.2d at 152, 88 USPQ at 480-81:

[I]t appears that the preamble has been denied the effect of a limitation where the claim or count was drawn to a structure and the portion of the claim following the preamble was a self-contained description of the

structure not depending for completeness upon the introductory clause * * *. In those cases, the claim or count apart from the introductory clause completely defined the subject matter, and the preamble merely stated a purpose or intended use of that subject matter.

While we do not subscribe to the broad proposition that process limitations can never serve to distinguish the subject matter of apparatus claims from the prior art, we fail to see how the general process parameters of claim 6 require an arrangement of the apparatus means recited in claims 30-35 more specific than that set forth in the body of each claim. In no claim is the preamble relied on to provide an antecedent basis for terms in the body. See *In re Higbee*, 527 F.2d 1405, 188 USPQ 488 (CCPA 1976). The context of each invention is clear without reference to claim 6, unlike the situation in *Kropa*, *supra*, in which the preamble "An abrasive article" was the only portion of the claim defining the relationship of the components recited in the body of the claim; the court said, "The term calls forth a distinct relationship between

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the proportions of grain and resin comprising the article." 38 CCPA at 862, 187 F.2d at 152, 88 USPQ at 481.

[18] Appellants do not argue the patentability of claims 32-35 separately from claim 30 and concede that Carpenter discloses the feature added in claim 31. We find that the teachings of Pfluger and De George (and Carpenter on claim 31) show that the subject matter of claims 30-35 would have been obvious to persons of ordinary skill in the art. These references are to be viewed for what they disclose in their entireties and not merely for their inventive contributions to the art. *In re Ogiue*, 517 F.2d 1382, 1387, 186 USPQ 227, 232 (CCPA 1975).

Pfluger 1963, in a portion carried forward to the patent, discloses the following:

Advantageously, in following the teachings of the present process either in a vacuum freeze drying application or in an atmospheric freeze drying application, the frozen foamy mass may be arranged for either batch or continuous processing in any one of a variety of conventional plant handling applications. Thus, the foamy mass can be readily transferred from one food handling station to another, deposited in trays or continuous belts, superimposed on one another or otherwise conventionally located in the vicinity of the freeze drying influences. In the case of a typical freeze drying operation the foams may be frozen and deposited onto trays stacked one above the other on a suitable heat transfer surface in a vacuum chamber. In the case of an atmospheric freeze drying application the foams can be stacked one upon the other upon a foraminous drying member permitting the circulation of the drying medium, e.g. dry air, helium or nitrogen. Throughout all of such freeze drying applications it is imperative that the temperature of the foamy mass be maintained below the eutectic point of the material while drying to assure that the foam stays in a substantially solid or frozen state as distinguished from a melted or semi-liquid state, dehydration of the mass being achieved by a process of sublimation as distinguished from one of evaporation. Such conditions should be followed at least until the moisture content of the foamy mass has been substantially reduced to a point where it has lost at least a majority of its moisture and preferably is superficially dry to the touch, i.e. in the neighborhood of 10-20% moisture by weight.

Example VI of Pfluger 1963, which is carried forward as Example III of the Pfluger patent, shows heat controlling the vacuum chamber to assure a product temperature below -10°F . (De George teaches that the melting point of a 28% solids content extract is about 27°F ., whereas the eutectic temperature is constant regardless of concentration at about -13.5°F .) De George discloses the use of endless belts, low speeds, and refrigerating means, and appellants, while arguing that De George treats the handling of solid slabs of frozen extract on refrigeration belts and not frozen foamed extracts, do not and cannot deny that De George discloses apparatus that persons of ordinary skill in the art would have deemed *suitable* for handling foams in the manner shown by Pfluger. Appellants also contend that neither reference discloses the "spreading device" recited in the claims, Pfluger 1963 showing only the application of n diameter ribbons of foam through a nozzle to stationary freeze drying trays. The

reference in the portion of Pfluger 1963 quoted supra to the deposition of the foam on the belts is ample suggestion, in our opinion, that some means must be employed to apply the foamy mass to the continuous belts. The term "spreading device" is not defined in any special way by appellants and is broad enough to be the means for applying the foam to the belt suggested by Pfluger. The rejection of claims 30-35 is affirmed.

C. Product Claims 15 and 40-43

[19] These claims are cast in product-by-process form. Although appellants argue, successfully we have found, that the Pfluger 1963 disclosure does not suggest the control of bulk density afforded by appellants' process, the patentability of the *products* defined by the claims, rather than the processes for making them, is what we must gauge in light of the prior art. See *In re Bridgeford*, 53 CCPA 1182, 357 F.2d 679, 149 USPQ 55 (1966). Each of these claims defines a freeze-dried instant coffee product made by processes which, appellants have contended with respect to their process claims, produce, by virtue of the foam density and solids content ranges taught by appellants, products having a bulk density comparable to spray-dried instant coffee, i.e., 0.2-0.3 gm/cc as indicated in appellants' specification. The solids content and foam density ranges disclosed by Pfluger 1963 overlap those of appellants, and, it appears, the Pfluger process using solids contents and foam densities overlapping those of appellants will produce instant coffee which is indistinguishable from appellants' products. There is no evidence showing that Pfluger's product prepared, for example, using an extract of 30% solids con

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tent foamed to a density of 0.5 gm/cc differs from appellants' claimed products in any way, certainly not in any unobvious way. See *In re Avery*, 518 F.2d 1228, 1233-34, 186 USPQ 161, 165-66 (CCPA 1975). That *some* of the products *covered* by appellants' claims may not be disclosed or suggested by Pfluger 1963 is not relevant to patentability, since the claims embrace other subject matter completely disclosed by Pfluger 1963, complete disclosure in the prior art being the epitome of obviousness. *In re Pearson*, 494 F.2d 1399, 181 USPQ 641 (CCPA 1974). The rejection of these product claims under § 103 on Pfluger⁹ is affirmed.

Conclusion

The appeal is dismissed as to withdrawn claims 3, 5, 36, and 39. The decision of the board is affirmed as to claims 1, 4, 6-16, 21-28, 30-35, and 40-43, and is reversed as to claims 2, 17-20, 29, 37, and 38.

APPENDIX

2. The process of claim 1 wherein the extract is concentrated to between 35% and 60% soluble solids prior to the foaming step.
3. The process of claim 2 wherein the concentrated extract is foamed to an overrun density of between 0.1 to 0.7 gm/cc.
4. The process of claim 2 wherein the frozen foam is vacuum freeze-dried at a pressure of less than 500 microns and a final product temperature of less than 110°F.
5. The process of claim 3 wherein the frozen foam is vacuum freeze-dried at a pressure of less than 500 microns and a final product temperature of less than 110°C.
7. A process according to claim 6 in which said inert gas is at least one of the following gases, namely carbon dioxide, nitrous oxide and nitrogen
8. A process according to claim 6 in which the foam is frozen during 7 to 25 minutes.
9. A process according to claim 6 in which the foam is frozen on a moving belt which is cooled to a temperature between —12 and —70°C.
10. A process according to claim 6 wherein the foam is spread on the belt at a layer thickness of 10 to 40 mm.
11. A process according to claim 6 in which the frozen foam is ground, before freeze-drying, to a particle size approximately equal to that of roast and ground coffee.
12. A process according to claim 6 in which an aromatic condensate obtained by stripping roast and ground

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coffee is added to said concentrated extract before it is transformed into a foam.

13. A process according to claim 6 in which, after freeze-drying, the powdered coffee extract is aromatised by incorporation therein of 0.1 to 0.5% by weight of an aromatic condensate obtained by stripping of roast and ground coffee.

14. A process according to claim 13 in which said condensate is incorporated in said powdered extract in admixture with an oily carrier.

15. The coffee extract obtained by the process defined in claim 6.

16. Process according to claim 6 in which the frozen foam is ground to a particle size of about 0.25 to 2.0 mm.

17. Process according to claim 6 in which the freeze dried extract has a density of about 0.2 to 0.3 gm/cc.

18. Process for preparing a soluble coffee extract, which comprises adding inert gas to a concentrated aqueous extract of roast coffee having a solids content of about 25% to about 60% to provide a foam, freezing the foam to a solid mass, reducing the frozen foam to particles having a size of about 0.25 to 2.0 mm and freeze drying the frozen particles, the amount of inert gas added to the aqueous extract being sufficient to provide a freeze dried extract having a density between about 0.2 and 0.3 gm/cc.

19. Process for preparing a powdered coffee extract which comprises adding sufficient inert gas to a concentrated aqueous extract of roast coffee to provide a foam having a density between about 0.6 and about 0.8 gm/cc, freezing the foamed extract to a solid mass, grinding the frozen foam to an average particle size of 0.1 to 0.5 mm, freeze drying the ground particles to provide a finely powdered coffee extract, and agglomerating the finely powdered coffee extract.

20. Process according to claim 19, in which the powdered extract is agglomerated to provide an agglomerate having a density of about 0.2 to 0.3 gm/cc.

21. Process for preparing a powdered coffee extract which comprises increasing the soluble coffee solids content of an aqueous extract of roast ground coffee to about 25% — 60% by freeze concentration, separating the concentrated extract from ice crystals, adding an inert gas to the concentrated aqueous extract to provide a foam having a density between about 0.4 and 0.8 gm/cc, freezing the foam to a solid mass and freeze drying the frozen foam.

22. Process according to claim 21 in which the inert gas is selected from the group consisting of carbon dioxide, nitrous oxide and nitrogen.

23. Process according to claim 21 in which the foam is frozen during 7 to 25 minutes.

24. Process according to claim 21 in which the foam is frozen on a moving belt which is cooled to a temperature between —12 and —70°C.

25. Process according to claim 24 wherein the foam is spread on the belt at a layer thickness of 10 to 40 mm.

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26. Process according to claim 21 in which the frozen foam is ground before freeze drying to a particle size of at least 0.25 mm.

27. Process according to claim 26 in which the frozen foam is ground to a particle size of about 0.25 to 2 mm.

28. Process according to claim 21 in which the frozen foam is ground before freeze drying to a particle size approximately equal to that of roast and ground coffee.

29. Process according to claim 21 in which the freeze dried extract has a density of about 0.2 - 0.3 gm/cc.

31. An apparatus according to claim 30 in which the means for cooling the belt includes a plurality of sprinklers disposed to spray the refrigerant onto the underside of the belt.

32. An apparatus according to claim 30 in which the belt comprises two sections each provided with separate cooling means, the first of said sections being cooled to a temperature of —12 to —29°C and the second section to

—40 to —70°C.

33. An apparatus according to claim 30 also comprising means for fragmenting and milling the frozen foam.

34. An apparatus according to claim 30 in which the length of said belt is 15 to 25 metres and the driving means is adapted to move said belt at a linear speed of about 0.5 to 1.5 m/min.

35. An apparatus according to claim 30 in which said chamber is adapted to be maintained at a temperature of —25 to —45°C.

36. The process of claim 2 wherein the concentrated extract is foamed to an overrun density of between about 0.1 to 0.8 gm/cc.

37. The process of claim 2 wherein the concentrated [506] extract is foamed to an overrun density of between 0.4 to 0.8 gm/cc.

38. The process of claim 2 wherein the frozen foam is vacuum freeze-dried at a pressure of about 150 to 175 microns.

39. The process of claim 3 wherein the frozen foam is vacuum freeze-dried at a pressure of about 150 to 175 microns.

41. A coffee powder according to claim 40 wherein the extract before freeze drying contains about 25% to 60% by weight of soluble coffee solids.

42. A dry coffee powder having a density of about 0.2 to 0.3 gm/cc and comprising a freeze dried particulated foamed extract of roast and ground coffee, said extract containing before freeze drying up to about 60% by weight of soluble coffee solids.

43. A coffee powder according to claim 42 containing about 0.1% to 0.5% by weight of aromatic condensate obtained by stripping roast and ground coffee.

Footnotes

Footnote 1. A continuation (or continuation-in-part, as the examiner has required it to be denominated) of application serial No. 537,679, filed March 28, 1966. Appellants claim the benefit of a Swiss application filed April 2, 1965. The title of the application on appeal is somewhat inaccurate, as the application contains claims to apparatus for drying and dried instant coffee products as well as to a drying method.

Footnote 2. So that consumers may continue to use the same amount of freeze-dried instant coffee per cup as conventional instant coffee without change in the strength of the beverage that they are accustomed to.

Footnote 3. 37 CFR 1.204(c):

When the effective filing date of an applicant is more than three months subsequent to the effective filing date of the patentee, the applicant, before the interference will be declared, shall file two copies of affidavits or declarations by himself, if possible, and by one or more corroborating witnesses, supported by documentary evidence if available, each setting out a factual description of acts and circumstances performed or observed by the affiant, which collectively would prima facie entitle him to an award of priority with respect to the effective filing date of the patent. This showing must be accompanied by an explanation of the basis on which he believes that the facts set forth would overcome the effective filing date of the patent.

Footnote 4. The examiner and the board did not rely on Pfluger 1963 because the solids content and foam density ranges of the copied claims were not described in that application. In re Lund, 54 CCPA 1361, 376 F.2d 982, 153 USPQ 625 (1967).

Footnote 5. Peebles U. S. patent No. 2,897,084, issued July 28, 1959, was cited against claims 19 and 20 to show that agglomerating fine dried coffee particles into larger grounds was old in the art. Appellants have acknowledged this to be true, so it is not necessary to discuss Peebles further.

Footnote 6. The solicitor belatedly asserts that the Swiss application is not "for the same invention" as the parent

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application, insofar as claims 1, 2, and 4 are concerned; he argues that the expression "same invention" in 35 USC 119 should be given the meaning employed by us in the double patenting cases, e.g., *In re Vogel*, 57 CCPA 920, 422 F.2d 438, 164 USPQ 619 (1970). As we indicated in *In re Ziegler*, 52 CCPA 1473, 347 F.2d 642, 146 USPQ 76 (1965), the solicitor's reading is too narrow. All § 119 requires is that the foreign application describe and seek protection for "broadly the same invention" as described in the U.S. application claiming its benefit. 52 CCPA at 1481, 347 F.2d at 649, 146 USPQ at 82. The Swiss application has essentially the same disclosure as appellants' parent application and claims broadly the same invention.

Footnote 7. That the final product temperature limitation is not material, as appellants argue, does not matter when the limitation is copied. Immateriality excuses only *failure* to copy a limitation of a patent claim. See *Brailsford v. Lavet*, 50 CCPA 1367, 318 F.2d 942, 138 USPQ 28 (1963); 37 CFR 1.205(a).

Footnote 8. Appellants do not deny that the features added in claims 7, 12, 13, and 14 are taught in the art, and the record shows them to be known in the prior art.

Footnote 9. Appellants argue in their reply brief that claims 40-43 "were never the subject of an accurate or proper rejection," because the examiner and the board incorrectly grouped them with other claims. As we have indicated, the rejection of claims 40-43 on Pfluger under § 103 was "proper"; appellants do not contend that they could not understand the basis for the rejection because of failure of the PTO to give clear reasons for its action under 35 USC 132, and we find the explanations given by the examiner and board with respect to claims 40-43 to have been legally ample under § 132. Cf. *In re Gustafson*, 51 CCPA 1358, 331 F.2d 905, 141 USPQ 585 (1964).

Concurring/Dissenting Opinion Text

Concurrence/Dissent By:

Baldwin, Judge, concurring in part and dissenting in part.

I agree with Judge Miller's treatment of claims 17-20 and 29. Otherwise, I join the majority opinion.

Concurring/Dissenting Opinion Text

Concurrence/Dissent By:

Miller, Judge, dissenting in part and concurring in part.

I dissent on claim 1. The error of the majority in affirming the rejection stems from a misstatement of the issue. It is not necessary when antedating a reference under 35 USC 102(a) or (e) to establish a prior reduction to practice, constructive or actual, of *all* the subject matter falling within the claims. It is necessary only to establish a reduction to practice of sufficient subject matter to render the claimed invention obvious to one of ordinary skill in the art. *In re Spiller*, 500 F.2d 1170, 182 USPQ 614 (CCPA 1974). The majority errs, therefore, in seeking a description in appellants' parent and foreign priority applications to support the entire claimed subject matter as though these were the applications in which the claims appear. See *In re Ziegler*, 52 CCPA 1473, 347 F.2d 642, 146 USPQ 76 (1965). Appellants have clearly shown possession of enough of the invention to antedate Pfluger 1966 by establishing a prior constructive reduction to practice in their parent and foreign applications of specific embodiments disclosing concentrating to 50% and 36% total solids and by a broader disclosure of "25 to 60%."

Although the rejection of claim 1 arises in the context of an attempt to initiate an interference, the rejection is clearly under 35 USC 102(a) or (e) and not under Rule 204(c), 37 CFR 1.204(c). Even if the rejection were under that rule, the substance of the rule's requirement for evidence sufficient to establish a *prima facie* case for a judgment of priority against Pfluger 1966 would be satisfied by the prior constructive reduction to practice of embodiments within claim 1 in appellants' parent and foreign applications. *Hunt v. Treppschuh*, 523 F.2d 1386, 187 USPQ 426 (CCPA 1975); *Fontijn v. Okamoto*, 518 F.2d 610, 186 USPQ 97 (CCPA 1975).

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<http://www.bna.com/corp/index.html#V>

The majority cites *In re Gemassmer*, 51 CCPA 726, 319 F.2d 539, 138 USPQ 229 (1963), to support its decision on claim 1. It suffices to note that *Gemassmer* was decided more than a decade before *In re Spiller*, *Hunt v. Treppschuh*, and *Fontijn v. Okamoto*, *supra*.

I concur in the decision on claim 4 since appellants' parent and foreign applications are silent regarding final product temperature and a secondary heating step and, therefore, fail even as a constructive reduction to practice of the invention of claim 4.

I concur also in the decision on claims 19 and 20, but I do not find it necessary to hold, as the majority implicitly does, that "about 0.6" gm/cc excludes 0.5 gm/cc disclosed in the reference as the upper limit of merely a *preferred* range. Moreover, it is obvious from the reference that the process would work at a higher density than 0.5,

Page 106

although inferior results might be expected. My concurrence rests on the requirement of claims 19 and 20 of a specific sequence of steps not suggested by the prior art, namely: providing a high density of about 0.6 to about 0.8 gm/cc, grinding to a fine particle size prior to freeze drying, freeze drying, and finally agglomerating the fine particles into larger particles. This achieves a "highly coloured product of regular particle size." There is no suggestion in the prior art of deliberately grinding to a fine size and then agglomerating to a larger size.

I dissent on claims 17, 18, and 29, because there is at least a *prima facie* relationship between product and foam densities. The board noted this by stating that "the freeze dried density of the coffee would be inherent in view of the same range of foam overrun density disclosed by Pfluger." Since the foam densities and other conditions disclosed by Pfluger for the process claimed are approximately the same, appellants should be required either to show that the reference does not achieve the same product densities or to establish criticality. Since they have not done so, I would affirm the rejection of claims 17, 18, and 29.

- End of Case -

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held at distances of approximately 5 inches and 6 inches from the surface to be coated, while Shepard in the Shepard (II) patent in describing an example of his process, calls for a spray distance of "approximately 4 inches in length" for the application of the molybdenum to the metal. In spraying molybdenum "according to the Shepard process disclosed in said patents," the affiant could, obviously, have employed a spray distance of approximately 4, 5 or 6 inches. The distances mentioned in the two Shepard patents might well be effective, especially since, as we have noted, no specific distances are stated by appellant in his specification.

The affiant also attributes a "higher temperature for the work piece" as a reason for the improved bond strength. The Shepard patents, however, indicate the need for a sufficiently high temperature in the melting zone. Both of the Shepard patents state:

"Excessive oxidation conditions may be avoided by using a relatively slow wire speed for the molybdenum as it feeds through the gun and by using oxygen as little as possible and still obtain a sufficiently high temperature in the melting zone."
[Emphasis ours.]

Moreover, the affiant makes no mention of the specific temperatures employed in producing the test specimens.

Appellant contends that the sufficiency or probative value of the affidavit "is believed to be moot or 'adjudicated' since the Patent Office has already twice accepted it and considered it favorably." It does appear that the same affidavit was submitted in two applications which have now matured into patents. However, it is obvious that that has no bearing on the present case. The considerations which led to the allowance of those patents are not matters of record in this proceeding. The only issue here is whether the affidavit supports appellant's contention that his invention is patentable over the cited references. We

do not think that the affidavit has this effect.

In summary, the Hensel et al. patent and the Coppen patent disclose, respectively, a steel reinforced aluminum alloy bearing and the use of oil grooves in a bearing. We think it would be obvious to a person of ordinary skill in the art to employ the Shepard process with the teachings of the Hensel et al. and Coppen patents to produce appellant's invention.

For the foregoing reasons the decision of the board is affirmed.

Affirmed.



50 CCPA

Application of Giorgio G. SOLI

Patent Appeal No. 6999.

United States Court of Customs
and Patent Appeals.

June 6, 1963.

Application for patent for petroleum and natural gas prospecting method by determining presence and relative amounts of hydrocarbon-oxidizing bacteria in the soil at various depths. The Board of Appeals of the United States Patent Office, Serial No. 587,521, affirmed examiner's rejection of method claim and the applicant appealed. The United States Court of Customs and Patent Appeals, Rich, Judge, held that the method was unpatentable in view of the prior art.

Affirmed.

1. Patents \Rightarrow 113(1)

Wherever possible, issues should be crystallized before appeal to United States Court of Customs and Patent Appeals.

2. Patents \Rightarrow 113(1)

It is neither function of oral arguments nor briefs before United States Court of Customs and Patent Appeals

to question for first time propriety of actions of patent examiner or board of appeals to which a response conveniently could have been made before patent office.

3. Evidence \Rightarrow 21

United States Court of Customs and Patent Appeals would take judicial notice of use of controls in various experimental procedures.

4. Patents \Rightarrow 17(1)

It is well within ordinary skill of art to use a control in experimental procedures.

5. Patents \Rightarrow 113(7)

When patent office finds differences between subject matter sought to be patented and prior art, it may not, without some basis in logic or scientific principle, merely allege that such differences are either obvious or of no patentable significance and thereby force an applicant to prove conclusively that patent office is wrong. 35 U.S.C.A. § 103.

6. Patents \Rightarrow 113(7)

Proof that an applicant must offer to overcome a position of patent office supporting a rejection can be determined only on basis of facts in any particular case.

7. Patents \Rightarrow 66(1.24)

Method for petroleum and natural gas prospecting by determining presence and relative amounts of hydrocarbon-oxidizing bacteria in soil at various depths was unpatentable in view of prior art.

Conder C. Henry, Washington, D. C., for appellant.

Clarence W. Moore, Washington, D. C. (Raymond E. Martin, Washington, D. C., of counsel), for the Commissioner of Patents.

Before WORLEY, Chief Judge, and RICH, MARTIN, SMITH, and ALMOND, Jr., Judges.

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of method

claim 13, the sole claim in application Ser. No. 587,521, filed May 28, 1956, for "Petroleum and Natural Gas Prospecting."

The basis for and the general nature of appellant's invention is disclosed in the specification as follows:

"The method is based on the fact that, in many instances in oil and gas areas, gaseous hydrocarbons are slowly escaping through the sedimentary formations to the surface. These gases serve as a steady supply of carbon and energy to hydrocarbon-oxidizing bacteria, resulting in the intensive multiplication of these micro-organisms.

* * * * *

"The present invention is directed to a method of determining the presence and relative amounts of hydrocarbon-oxidizing bacteria in the soil, these bacteria being an indication of the presence of petroleum hydrocarbons. A feature of the invention is utilization of the ability of hydrocarbon-oxidizing bacteria to grow and produce turbidity [i. e., a murky or muddied condition] in a liquid mineral culture medium in which a hydrocarbon gas is dissolved."

Claim 13 reads as follows (the breakdown being ours):

"13. A method of prospecting for subterranean hydrocarbon deposits comprising the steps of

"[1] collecting samples of soil at various depths in certain locations in a prospective area,

"[2] incubating at least one culture of each of said soil samples in a mineral nutrient liquid medium in the presence of an atmosphere of methane,

"[3] simultaneously incubating at least another of said cultures of each of the same soil sample in a mineral nutrient liquid medium in the presence of an atmosphere of propane,

"[4] simultaneously incubating an additional culture of said

same soil sample in a mineral nutrient liquid medium in the presence of atmospheric air,

"[5] determining the amount of hydrocarbon-oxidizing bacteria in said cultures by

"(a) a measurement of the amount of turbidity of said nutrient medium caused by the growth of said bacteria exposed to said methane and propane atmospheres, and

"(b) using said culture incubated in the presence of atmospheric air as a control for said first-mentioned cultures,

"[6] the ratio of soil to culture medium being kept to a minimum."

The Patent Office has rejected this claim as unpatentable over the combined teachings of the following references:

Taggart 2,349,472 May 23, 1944
Strawinski 2,665,237 Jan. 5, 1954
Porter, Bacterial Chemistry and Physiology, John Wiley & Sons, Inc., 1946, page 95.

Both Taggart and Strawinski disclose methods of prospecting for subterranean hydrocarbon deposits which include collecting samples of soil at various depths in certain locations in a prospective area and thereafter employing various means to analyze the amount of and/or kind of hydrocarbon-oxidizing bacteria in such samples. The pertinence of the Porter reference will be discussed later.

Appellant's several arguments as to why the references of record would not render his invention obvious to one skilled in the art will be considered as they relate to the above-designated sections of his claim.

Section [1]: Soil Sampling Depth.

Appellant argues in his brief

"Particular attention is given [in appellant's invention] to the depth of sampling in relation to the amount of organic matter in the soil, since appreciable amount of such organic matter could unfavorably affect the

final results. The amount of organic matter decreases with depth; therefore, the deeper the samples within certain limits, the more reliable the results. Decomposition of organic matter in the first layers of soil could give rise to methane gas, which would support methane-oxidizing bacteria, which, in turn, would furnish false positive results as far as the presence of oil and gas at greater depths is concerned. For this reason alone, it is submitted, appellant's claim is patentable over Taggart [sic], who specifies 6 inches of surface soil, and Strawinski, who also specifies surface soil at a slightly greater depth. [Strawinski designates this depth as "below six inches, preferably at depths of 24" or more."]"

It is clear that the disclosure in appellant's specification does not make soil-sampling depth critical. At one portion thereof it states that soil samples should be taken "at a depth not less than 6 feet." Another portion thereof states, however, merely that soil samples should be collected "at a depth where organic matter is reduced to a minimum." In view of these facts and additionally in view of the fact that we can see no distinction of substance between a depth of soil sampling which may be less than 6 feet and one, as disclosed in Strawinski, which may be two feet "or more" we are not persuaded, by appellant's argument that we should "interpret" the claim in the light of his specification disclosure, that even such an "interpretation" would distinguish the claim from the prior art. All the claim contains by way of limitation is "various depths." It appears to include depths of the prior art.

Sections [2] and [3]: Simultaneously Incubating in Different Atmospheres Portions of the Same Soil Sample in a Liquid Medium.

Appellant's specification discusses this aspect of his invention as follows:

"* * * this invention is directed to the simultaneous isolation of bac-

teria able to use methane and to bacteria which attack ethane or propane but which may not be able to use methane. Since we know that neither ethane nor propane are commonly found in soil as a result of decomposition of organic matter, the separate use of methane and propane (or ethane) as test gasses on the same soil sample is an important part of this invention."

To this end appellant places a measured amount of a liquid "culture medium" into five vials.¹ These vials are then "innoculated" with measured amounts of soil. Two of the vials are then filled with methane, two with propane. The contents of the fifth vial will be discussed, infra. The vials are then incubated for two weeks at a temperature of approximately 28° to 30°C.

As to the reason why methane and propane atmospheres should not be mixed, the specification says:

"If growths occurred only in the cultures incubated under an atmosphere of methane, the results for these particular soil samples are held as questionable, for the presence of bacteria able only to oxidize methane, cannot be taken as a positive indication of petroleum hydrocarbons for reasons explained above. If bacterial growth occurred both in methane and propane-exposed cultures, then the results are recorded as positive."²

The relationship between the above portions of appellant's disclosure and the relevant portions of the Taggart and

Strawinski references can readily be seen from the following analysis thereof made by the board:

"Taggart takes samples of soil from spaced points in the area under investigation, and places each sample in a sealed chamber containing a hydrocarbon gas and oxygen. The samples are allowed to stand for a previously selected period of time. Taggart found that when a sample contains substantial amounts of hydrocarbon-consuming bacteria a pressure drop occurs in the atmosphere above the sample. A manometer attached to the chamber containing the sample is read periodically and the drops in the pressure are recorded. * * *"

"Strawinski is asserted to be an improvement on the Taggart method. Strawinski collects samples from the area under investigation in the same general manner as Taggart. Each sample is thoroughly mixed with a nutrient medium and about 50 ml of the mixture is placed in a reactor vessel. A gas mixture preferably composed of carbon dioxide, oxygen or air and methane at substantially atmospheric pressure is then admitted to the reactor vessel and the latter is connected by a siphon arrangement to a reservoir under atmospheric pressure containing the same nutrient medium that was mixed with the soil sample. The reactor vessel contents are then allowed to

1. In discussing the culture medium appellant's specification says:

"The composition of the culture medium needs also particular attention, especially in the method described herein as the method itself relies for its diagnostic aims on the presence or absence of bacterial growth. The medium, therefore, should be such as to promote the growth of hydrocarbon-oxidizing bacteria and discourage the growth of other micro-organisms."

Inasmuch, however, as claim 13 does not state the composition of this medium, we will not consider further the particular composition of appellant's liquid culture medium.

2. Appellant's reference to "recorded" results is directed to the fact that after the degree of turbidity of the vial cultures is determined and the results labeled as positive or questionable, these results are placed on a map of the area from which the soil samples were taken, next to the particular soil sample to which the results relate. Lines are drawn on this map connecting the points of soil sampling where the soil contains equal amounts of hydrocarbon-oxidizing bacteria as determined by the method of the appealed claim. A similar mapping of test results is disclosed by Strawinski.

undergo incubation at a temperature of 25 to 35°C. After standing for some time it is observed that some of the nutrient medium has passed from the reservoir into the reactor vessel by reason of consumption of gas in the latter vessel by the microorganisms in the soil sample. This transfer of nutrient medium from the reservoir to the reactor is permitted to continue until an arbitrarily selected liquid level is reached in the reactor vessel. The patentee states that a liquid level corresponding to a volume of 100 ml is sufficient to indicate with sufficient accuracy completion of the reaction of the microorganisms on the hydrocarbon. Strawinski therefore measures the time which elapses for the level of liquid in the reactor to reach the 100 ml mark, and this time is an indication of the activity of the microorganisms in the sample."

We also note with respect to Taggart that he discloses—

"* * * that the general principle involved in the present invention can be utilized without following the specific procedure outlined above. * * *. Another refinement is to divide each sample into portions and subject one portion to the action of methane, while another portion is subjected to the action of heavier hydrocarbons under the same conditions, the same concentration of hydrocarbons being used in each case. This procedure serves to eliminate errors which might arise by reason of the fact that the soil may contain bacteria which have a preferential action on methane."

We think it unquestionably clear that Taggart discloses appellant's contemplated *simultaneous* incubation, in *different* hydrocarbon atmospheres, of portions of the same soil sample. We consider unimportant the fact that Taggart does not employ in these incubations a liquid nutrient medium inasmuch as Strawinski clearly discloses that the art had recog-

nized the existence of uncontrollable "variables" which would be encountered in attempting an incubation of hydrocarbon-oxidizing bacteria in the absence of such a medium. In this regard Strawinski states:

"* * * such variables are eliminated by the use of a relatively large amount of [liquid] nutrient which amount compared to any moisture content of the sample and any nutrient content is so large that any variations in moisture or nutrient content are substantially 'ironed out' and each sample virtually standardized."

Sections 4 and 5(b): *Incubating in Atmospheric Air Another Portion of the Same Soil Sample in a Liquid Medium and Using This Incubation as a "Control."*

The contents of appellant's previously noted fifth vial differs from those of his others only in that atmospheric air is used therein rather than a hydrocarbon gas. The reason for this additional vial is disclosed as follows:

"If the soil samples were taken in the described manner, no [bacterial] growth will occur in the culture incubated under atmospheric air, as the hydrocarbon-oxidizing bacteria eventually present will not develop due to the absence of a carbon source. This serves as a control to ascertain that the eventual bacteria growths in the hydrocarbon-exposed cultures are not due to a carbon source other than the hydrocarbon."

The Patent Office position relating to the patentable significance of a control was set forth by the examiner. He said:

"Applicant states that Taggart has no such control like applicant's. There is no issue taken with this view, but when one is attempting to determine the number of bacterial cells that have come to be since a certain time lapse, how can that determination possibly be made without a control? Such a control is stand-

ard procedure throughout the entire field of bacteriology." ³

The solicitor notes that this statement by the examiner is "unchallenged." Appellant responds by asking whether he must deny all allegations of the examiner before he can appeal.

[1-4] This court has long held that wherever possible, issues should be crystallized *before* appeal to this court. It is neither the function of oral arguments nor briefs before this court to question for the first time the propriety of actions of the examiner or the board to which a response conveniently could have been made before the Patent Office. See *In re Chevenard*, 139 F.2d 711, 31 CCPA 802. This is not a case where the examiner's allegation appears to be based on mere conjecture. On the contrary, this court takes judicial notice of the use of "controls" in various experimental procedures. ⁴ Even if we were to assume, arguing, that the rule of this court were not as stated in the *Chevenard* case, we noted that appellant's attempt to refute what we think is the justifiable position of the Patent Office relating to the *skill of the art* consists merely of stressing what the Patent Office has admitted—that neither Strawinski nor Taggart discloses, by itself, the use of a control. On the question before us, we think that fact is not significant. It is well within ordinary skill of the art to use a control.

Section 5(a): *Determining the Amount of Hydrocarbon-Oxidizing Bacteria in the Cultures by Measuring the Turbidity of the Nutrient Medium.*

Appellant's disclosure in this regard states:

"The degree of turbidity in each of the four hydrocarbon-incubated cul-

tures is * * * measured by means of a colorimeter-spectrophotometer, * * * and the average turbidity from the four cultures [other than that using air as an atmosphere] for each soil sample calculated on the basis of transmission readings."

In discussing the pertinence of the reference disclosures on this point, appellant states: "Admittedly, the measurement of turbidity of a bacterial culture as an index of the number of bacteria present, is an old process. It is disclosed by Porter." He argues, however, that when his method is "viewed in its entirety" it may not properly be said that he has merely substituted Porter's method of estimating the number of bacteria present for either Taggart's or Strawinski's pressure-drop method. We do not agree. Appellant's argument seems to be predicated, at least in part, on the idea that his bacterial measurement is somehow more "direct" than that of either Taggart or Strawinski. We see no distinction, insofar as directness of measurement of bacterial growth is concerned, between the bacterial measurement method used by either Taggart or Strawinski on the one hand and that used by Porter and appellant on the other. Porter actually refers to the "*Opacity Method*" for "the enumeration of bacteria" as being an "indirect" method. Whatever doubt we might have on this point we would resolve against appellant in view of Strawinski's disclosure that a "spectrophotometer," while "not essential" in his process, may be used "to determine the actual amount of hydrocarbon consumed in milliliters." We feel that one skilled in the art, knowing from Strawinski that a photometric measure-

a control suspension of standard opacity, such as a barium sulfate solution or a bacterial suspension which has been previously counted." [Last emphasis ours.]

3. The Porter reference, while not cited by the Patent Office for this reason, would seem to support the examiner's position. It states:

"*Indirect Count.* Several methods have been proposed for the enumeration of bacteria by indirect methods.

"1. *The Opacity Method.* The opacity of the bacterial suspension to be estimated by this method is compared with

4. One need not stir from the TV to discover that "control" groups are used in such everyday occurrences as the testing of the efficacy of toothpaste.

ment had been used for one purpose in the gas and oil prospecting art, if wishing to improve the method of enumerating bacteria in a process utilizing a light-transmitting liquid culture medium, would be expected to turn to other references dealing with photometric measurements, similar to Porter, to see what other possible utilization could be made of such an indirect measuring means.

Section 6: *The Ratio of Soil to Culture Medium Being Kept to a Minimum.*

The board in discussing appellant's arguments relating to this section of the claim said:

"Appellant emphasizes that he keeps the ratio of soil to culture medium at a minimum. We are constrained to agree with the Examiner that this appears to be no more than conventional procedure in bacteriological experiments. Further, it appears to us that Strawinski would have a large excess of culture medium relative to soil."

We have not been persuaded by appellant that this position of the Patent Office "is unsound." As the solicitor would say, the board's allegation with respect to Strawinski is "unchallenged" even on appeal to this court. Furthermore, we see in appellant's specification in this regard merely a statement that a certain ratio of soil to culture medium "is the most satisfactory." No statement is contained therein that would give any basis to appellant's contention that a particular ratio is critical, nor, for that matter, what this ratio may be inasmuch as it is referred to merely as a "minimum."

[5-7] When, as in the instant case, the Patent Office finds, in the words of 35 U.S.C. § 103, "differences between the subject matter sought to be patented and the prior art," it may not, without some basis in logic or scientific principle, merely allege that such differences are either obvious or of no patentable significance and thereby force an appellant to prove conclusively that it is wrong. Such is not and never has been the rule relating to burden of proof in this court. What

proof an applicant must offer to overcome a position of the Patent Office supporting a rejection can be determined only on the basis of the facts in any particular case. In the instant case, however, the office position relating to the alleged obviousness of the differences which exist between the claimed invention and the prior art seems to us to be founded both on logic and sound scientific principle. We find that appellant failed to rebut this position.

The decision of the board is affirmed.

Affirmed.



50 CCPA

Application of Charles BLOCK and
John R. Gardner.

Patent Appeal No. 6900.

United States Court of Customs
and Patent Appeals.

June 6, 1963.

Proceeding on application for a patent for a photoprinting apparatus. The Board of Appeals of the United States Patent Office, Serial No. 676,261, affirmed examiner's rejection of claims 40 and 41 of the application, and applicants appealed, but withdrew their appeal as to claim 41. The Court of Customs and Patent Appeals, Smith, Judge, held that claim 40 was properly rejected as unpatentable over the prior art.

Affirmed.

Patents 66(1.25)

Claim 40 of an application for a patent for a photoprinting apparatus was properly rejected as unpatentable over the prior art.

Dale A. Bauer, Bauer & Seymour, New York City, for appellants.

Clarence W. Moore, Washington, D. C. (S. Wm. Cochran, Washington, D. C., of counsel), for Commissioner of Patents.

APPLICATION OF WAGNER

Cite as 371 F.2d 877 (1967)

877

⁵⁴ CCPA
Application of Arthur F. WAGNER and
Karl A. Folkers.
Patent Appeal No. 7689.

United States Court of Customs
and Patent Appeals.
Feb. 9, 1967.

Proceeding on application for patent on chemical compounds inhibiting growth of poliomyelitis viruses. The Board of Appeals of United States Patent Office affirmed the examiner's final rejection of all claims, and the applicants appealed. The Court of Customs and Patent Appeals, Smith, J., held that evidence of enhancement of biological or pharmaceutical activity of the compounds was sufficient to refute any inference of obviousness of structural changes in the compounds, and hence to establish patentability.

Reversed.

1. Patents \S 16, 25, 18

Patentability of new chemical compounds is not to be determined on basis of obviousness of structure alone, but biological or pharmaceutical properties must be considered. 35 U.S.C.A. \S 103.

2. Patents \S 36(1)

Evidence of enhancement of biological or pharmaceutical activity of chemical compounds for inhibiting growth of viruses was sufficient to refute any inference of obviousness of structural changes in the compounds, and hence to establish patentability. 35 U.S.C.A. \S 103.

3. Patents \S 18, 32

Factually unsupported opinions of board members and examiners do not provide factual basis required for determination of obviousness, nor establish a presumption of obviousness. 35 U.S.C.A. \S 103.

Senior District Judge, Eastern District of Pennsylvania, sitting by designation.

4. Patents \S 18

All prior art teachings must be factually evaluated in determining obviousness. 35 U.S.C.A. \S 103.

5. Patents \S 18

Prior art teachings unfavorable to position that invention was obvious may not be avoided by labeling them "unexpected," as one of ordinary skill in the art would evaluate them as a whole for what they fairly disclose. 35 U.S.C.A. \S 103.

6. Patents \S 18

In determining obviousness, differences between claimed compound and prior art may not be dismissed on the mere ground of not being "differences in kind." 35 U.S.C.A. \S 103.

7. Patents \S 18

An unexpected increase in physiological activity may be persuasive evidence of unobviousness, and in all cases is to be considered along with other evidence of unobviousness. 35 U.S.C.A. \S 103.

Harry E. Westlake, Jr., Rahway, N. J.
(John P. Floyd, New York City, I. Louis Wolk, Rahway, N. J., of counsel), for appellants.

Joseph Schimmel, Washington, D. C.
(Raymond E. Martin, Washington, D. C., of counsel), for the Commissioner of Patents.

Before WORLEY, Chief Judge, RICH, SMITH, and ALMOND, Judges, and Judge WILLIAM H. KIRKPATRICK.*

SMITH, Judge.

We are here concerned with the obviousness, 35 U.S.C. \S 103, of a joint invention¹ of appellants relating to new chemical compounds and to compositions containing such compounds for inhibiting the growth of poliomyelitis viruses.

1. In Application No. 149,214, filed November 1, 1961. No claims have been allowed.

The Board of Appeals affirmed the examiner's final rejection of appealed claims 1 to 10.

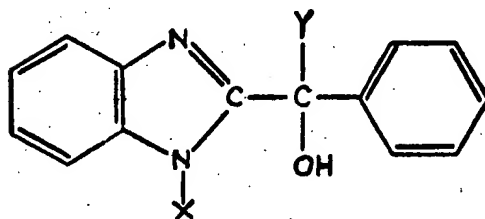
The specification points out that:

Science is beginning to secure control of poliomyelitis by means of immunization vaccines. There is, however, another approach to the control of this disease and especially the spread of its viruses. This is to find compounds capable of inhibiting the growth of the viruses and of preventing cell damage therefrom.

It is appellants' position that their invention provides compounds which do so inhibit the growth of the viruses.

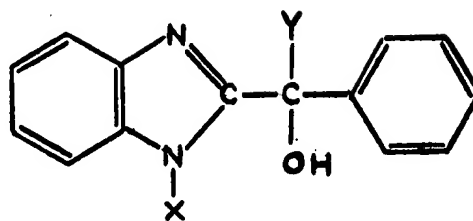
Claims 1 and 6 are representative and are here reproduced:

1. A compound of the structure—



in which X and Y are each selected from the group consisting of hydrogen and lower alkyl, at least one of X and Y being lower alkyl.

6. A method for inhibiting the growth of ECHO 6 and poliomyelitis viruses which comprises applying to cells infected with such virus a composition having as an active ingredient a compound of the structure



in which X and Y are each selected from the group consisting of hydrogen and lower alkyl, at least one of X and Y being lower alkyl.

As claimed, the invention is embodied in compounds defined in claims 1-5. As claimed in claims 6-10 the invention is embodied in "A method for inhibiting the growth of ECHO 6 and poliomyelitis viruses" which uses a composition which contains as an active ingredient the compounds of claims 1-5.

The references relied on to support the rejection are:

Siebart, 79 Amer. Chem. Soc. 4391 (1957).

Hollinshead [I], 52 Chem. Abst. 14845 (1958).

Other references cited by the examiner for evidentiary purposes are:

Hollinshead [II], 123 J. Pharm. Exper. Therap. 54 (1958).

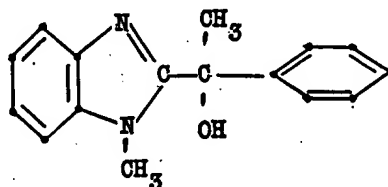
Tamm, 113 J. Exper. Medicine 638 (1961).

The examiner rejected the claims as unpatentable over Siebart and Hollinshead I.

The factual differences between the invention claimed and the prior art are discussed in appellants' brief as follows:

THE RELATION BETWEEN THE CLAIMED COMPOUNDS AND THE PRIOR ART

The claimed compound closest to the prior art is one of the structure



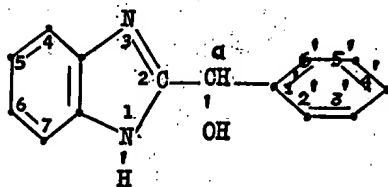
COMPOUND A
[Claim 3]

APPLICATION OF WAGNER

Cite as 371 F.2d 877 (1967)

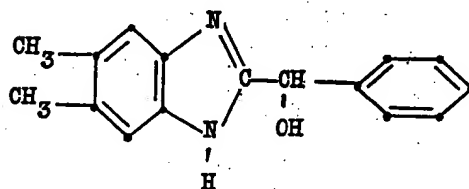
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* * * The cited art consists of the Compound B of the structure



COMPOUND B

cited by the Examiner and the Board, and the Compound C of the structure



COMPOUND C

which was relied on by Applicant, and cited by the Examiner to show the state of the art. The ordinary numbering of the places of substitution in this ring system is shown above in the structure of Compound B.

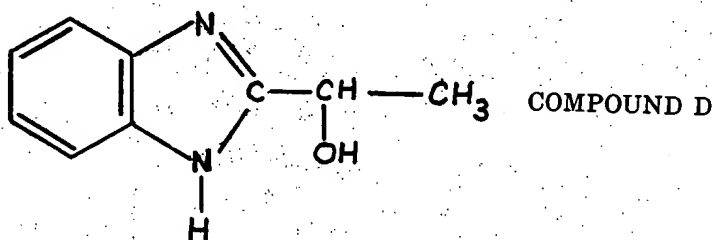
The solicitor argues the compound of claim 2, wherein CH_3 is substituted for H at the α position in Compound B, is the closest claimed compound to the prior art.

We will inject at this point the board's summary of the examiner's position:

The Examiner has rejected the appealed claim as being obvious over Siegert et al. and Hollinshead et al. Since the modification of a compound by the addition of one or more methyl groups is well known and thus obvious, and that Siegert et al. by their dis-

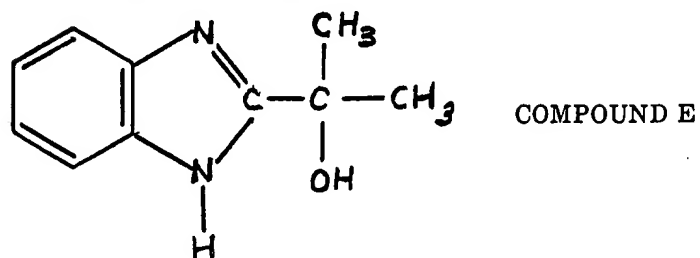
closure of the interchangeable use of methyl and hydrogen substituents in 2-hydroxy-alkylbenzimidazoles, albeit not specifically teaching compounds within the scope of the instant claims, would indirectly suggest the claimed compounds.

Appellants' position in regard to Siegert is that it describes the preparation of various compounds, analogs of which have been suggested to be "growth promoters." The compounds prepared include 2- α -hydroxyethylbenzimidazole of the structure



COMPOUND D

and 2-*a*-hydroxyisopropylbenzimidazole of the structure



In addition to Siegart, the Patent Office placed reliance on the other cited art as follows. Hollinshead I discloses that Compound B inhibits the growth of polio virus and influenza virus. Hollinshead II, the original article upon which Hollinshead I is based, is used for its additional disclosure that Compound B is ef-

fective against adenovirus. Tamm was relied upon because it discloses the virus inhibitory activity of various 2 (*a*-hydroxybenzyl) benzimidazoles, among other types of benzimidazoles. Such activity with respect to Poliovirus Type 2 is summarized in Table III.

TABLE III
Poliovirus Type 2 Inhibitory Activity and Selectivity of Benzimidazole and Benzotriazole Derivatives in Monkey Kidney Cells in Vitro

Group	No.	Compound	75 per cent virus inhibitory concentration (VIC)	Relative inhibitory activity (RIA)	3+ toxic concentration (TC)	Relative toxicity (RT)	Selectivity ratio (SR)	Relative selectivity (RS)
Benzimidazole derivative			μM		μM			
A	1	Benzimidazole	2800	1	5200	1	1.9	1
	3	3-Sulfonamide	2400	1.2	>6800	<0.59	>3.7	>1.9
	6	5-Benzimidazolesulfonamide	130	22	>270	<19	>2.1	>1.1
	7	5-Benzimidazolesulfon-(6'-toluidide)	96	29	>600	>13	>4.2	>2.2
B	9	3-(4'-Toluenesulfonamide)-	21	130	>60	<87	>2.9	>1.5
	10	3-(3',4'-Dichlorobenzenesulfonamide)-	12	230	>100	<52	>6.3	>4.4
	11	3-(3',4'-Dichlorobenzenesulfonamide)-1-(3'',4''-dichlorobenzenesulfonyl)-	10	280	>100	<52	>10	>5.3
	13	5-Trifluoromethyl	350	8.0	>450	<12	>1.3	>0.68
F	29	2-Aminoethyl-3,6-dichloro	130	22	950	55	7.3	3.8
	30	2-(β -Aminoethyl)-3,6-dichloro	~60	~47	~60	~67	~1	~0.53
	31	2-(γ -Aminopropyl)-3,6-dichloro	~60	~47	~60	~67	~1	~0.53
G	33	2-Hydroxymethyl	>3000	<0.74	>3800	<1.4	—	—
	34	2-(α -Hydroxyethyl)-	>3500	<0.60	>3500	<1.5	—	—
	35	2-(α -Hydroxybenzyl)-	36	78	>1100	<4.7	>31	>16
	36	2-(α -Hydroxybenzyl)-3-chloro	22	130	>640	<8.1	>29	>15
	37	2-(α -Hydroxybenzyl)-3,6-dichloro	160	20	>1300	<4.1	>9.1	>4.8
	38	2-(α -Hydroxybenzyl)-3,6-dimethyl	760	3.8	>1000	<5.2	>1.4	>0.74
	39	2-Benzoyl	760	3.8	>1100	<4.7	>1.5	>0.79
	40	2-Benzyl	95	29	>360	<14	>3.8	>2.0
Benzotriazole derivative								
J	48	Benzotriazole	2800	1	11000	0.47	3.9	2.1
	49	3-Chloro	500	5.6	1600	3.3	3.2	1.7
	50	5,6-Dichloro	73	38	260	20	3.6	1.9
	51	4,5,6-Trichloro	23	120	50	180	2.2	1.2
	52	4,5,6,7-Tetrachloro	8.1	350	12	430	1.5	0.79
K	54	5-Trifluoromethyl	240	12	>450	12	1.9	1.0

Cite as 371 F.2d 877 (1967)

It is the solicitor's position that Compound G-35 there shown is Compound B of the prior art, and Compounds G-36, -37 and -38 are respectively, a 5-chloro, 5,6-dichloro and 5,6-dimethyl derivatives of this compound. Considering the respective values 78 and 3.8 shown in the table for the anti-viral activities of Compounds B and G-38, (Compound C) the latter is said to be approximately $\frac{1}{20}$ as potent as Compound B against the virus in question.

The structural differences between the claimed invention and the disclosures of the prior art are to be found in appellants' substitution of alkyl groups in specific places. As stated in the specification:

We have found that 2-[α -hydroxybenzyl] benzimidazoles which are substituted with alkyl groups are more potent inhibitors of poliomyelitis and ECHO 6 virus than previously known compounds. These viruses are members of the class of entero-viruses, the members of which resemble one another in their reaction to these compounds, among many similar properties. We have found that alkyl groups on either the α -position of the benzyl moiety or on N¹ of the benzimidazole ring enhance the inhibitory activity.

The Patent Office maintains that the substitution of alkyl groups in the reference compound at the specific places as required by the claims would be obvious. There are eleven different places on which such radicals can be placed.

The invention as a whole which is in issue here, and which we must consider in resolving the section 103 issue, is a particular group of compounds which either alone or in compositions possess the property of inhibiting the growth of certain viruses and preventing cell damage therefrom. Thus, we have here an issue comparable to that before us in *In re Papesch*, 315 F.2d 381, 386, 50 CCPA 1084, 1091, where we stated:

The problem of "obviousness" under section 103 in determining the patentability of new and useful chemical

compounds, or, as it is sometimes called, the problem of "chemical obviousness," is not really a problem in chemistry or pharmacology or in any other related field of science such as biology, biochemistry, pharmacodynamics, ecology, or others yet to be conceived. It is a problem of patent law.

[1] After reviewing the pertinent authorities referred to in the *Papesch* decision, we stated there the principle which we find to be controlling here, 315 F.2d at 391, 50 CCPA at 1097:

From the foregoing cases it will be seen that this and other courts, both before and after the enactment of section 103, have determined the unobviousness and patentability of new chemical compounds by taking into consideration their biological or pharmacological properties. Nine of the ten cases above considered, directly and indirectly, involved such properties. Patentability has not been determined on the basis of the obviousness of structure alone. In fact, where patentability was found in the above cases it was found in spite of close similarity of chemical structure, often much closer similarity than we have here.

Here, as in *Papesch*, we think the decision of the board rests "on one fundamental error of law, namely, the failure to take into consideration the biological or pharmaceutical properties of the compounds." *Ibid*.

Pertinent to our resolution of the issue here is the further statement in *Papesch* that:

From the standpoint of patent law, a compound and all of its properties are inseparable; they are one and the same thing. The graphic formulae, the chemical nomenclature, the systems of classification and study such as the concepts of homology, isomerism, etc., are mere symbols by which compounds can be identified, classified, and compared. But a formula is not a compound and while it may serve in a claim to identify what is being patented, as

the metes and bounds of a deed identify a plot of land, the *thing* that is patented is not the formula but the compound identified by it. And the patentability of the thing does not depend on the similarity of its formula to that of another compound but of the similarity of the former compound to the latter. There is no basis in law for ignoring any property in making such a comparison. An assumed similarity based on a comparison of formulae must give way to evidence that the assumption is erroneous. *Ibid.*

Thus, in resolving the issue of obviousness under section 103, we must consider the entirety of the invention claimed and compare this with what in contemplation of law would have been obvious to one of ordinary skill in this art at the time of appellants' invention.

It is the solicitor's position as stated in his brief that:

If the Court is satisfied that the Board's holding as to structural obviousness was sound, the conclusion which will be dispositive of this appeal is the one announced in *In re Lohr et al.*, 50 CCPA 1274, 1279, 317 F.2d 388, 137 USPQ 548:

When a new compound so closely related to a prior art compound as to be structurally obvious is sought to be patented based on the alleged greater effectiveness of the new compound for the same purpose as the old compound, clear and convincing evidence of substantially greater effectiveness is needed.

We are concerned with this use of selected language taken from our opinion in *Lohr*. All statements therein must be read in the context of that case, the essential consideration being stated in the penultimate paragraph of the opinion, 317 F.2d at 392, 50 CCPA at 1279:

Considering all of the evidence in the record: the close structural similarity, the similar method of making the compounds, the similar properties, the same use, and the inconclusive showing of the affidavit, we are constrained to agree with the Board of Appeals that

the claimed compounds and compositions are obvious in view of the prior art.

While the above quoted statement preceded in time the decision of the Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966), it clearly sets forth the factual inquiry which both this court and the Supreme Court deem necessary in resolving issues of obviousness under section 103. On the *Lohr* record our inquiry established that a *factual* base existed for supporting the legal conclusion of the board that the invention was obvious under section 103.

The legal concept of obviousness under 103 cannot be frozen into set rules and concise statements of general applicability. The unanimous decision of the Supreme Court in the *Deere* case points out that the section 103 condition "lends itself to several basic factual inquiries," which are enumerated, 383 U.S. at 17, 86 S.Ct. at 694, as follows:

* * * Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy. * * *

In *Lohr* we recognized the difficulties in making the section 103 evaluation and our experience there, as in numerous other cases involving the issue, underscores and emphasizes the further observation of the Supreme Court in *Deere*, 383 U.S. at 18, 86 S.Ct. at 694, that:

* * * What is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context. The difficul-

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ties, however, are comparable to those encountered daily by the courts in such frames of reference as negligence and scienter, and should be amenable to a case-by-case development. We believe that strict observance of the requirements laid down here will result in that uniformity and definiteness which Congress called for in the 1952 Act.

These observations when applied to the facts of record here require that the decision of the board be reversed. Neither the examiner nor the board based the ultimate legal conclusions of obviousness on all the facts of record. Instead, their legal conclusions as to "obviousness" seem to be based on such general statements as "the modification of a compound by the addition of one or more methyl groups is well known and thus obvious." Further, "Siegart et al. by their disclosure of the interchangeable use of methyl and hydrogen substituents in 2-hydroxyalkylbenzimidazoles, albeit not specifically teaching compounds within the scope of the instant claims, would indirectly suggest the claimed compounds." How Siegart indirectly suggests the claimed compounds is not explained. It also appears that the board failed to make factual determinations in support of obviousness, as required by the *Deere* decision, for it stated in its opinion:

We are of the opinion that appellants' showing [affidavits of record alleging facts], even if considered relevant to the determination of obviousness, is not of such a character as to negate the obviousness of the claimed class of compounds. The claimed compounds are useful for the same purpose as taught for the prior art compound and no significant increased efficiency has been shown for them. A three to five fold increase in efficacy is, in our view, of insufficient magnitude to warrant a conclusion that the claimed materials are different in kind from the one disclosed by the references. They clearly have the same general property and homologous compounds are expected to differ among them-

selves to a certain extent. We are thus unable to agree with appellants' contention that their showing establishes advantages which are different in kind. In *re Lohr et al.*, 137 USPQ 548, 1963 CD 452. * * *

Under section 103 proof of facts by the applicants may be controverted by the Patent Office but they cannot, as here, be ignored or dismissed as irrelevant.

Underlying the decision of the board is its statement:

* * * we consider the claimed class of compounds to be so closely related to the reference compound as to make it presumptively obvious within the meaning of 35 USC 103. * * *

It appears that this "presumption" is based on the structural relationships of the claimed compounds and Compound B of the prior art. We have recognized that such relationships must be considered in determining issues which arise under section 103 but as stated in *In re Mills*, 281 F.2d 218, 223, 47 CCPA 1185, 1191:

* * * What the *Henze* case [*In re Henze*, 181 F.2d 196, 37 CCPA 1009, 85 USPQ 261] established is that there was an inference of fact that the adjacent homologue of the known chemical compound was unpatentable, and that such inference of fact placed the burden of persuasion on the applicant who asserted the contrary.

It is to be noted that in the *Mills* case we were not dealing with an adjacent homologue. Cf. *Brenner v. Manson*, 383 U.S. 519, 531, 86 S.Ct. 1033, 16 L.Ed.2d 69 (homologs and establishing utility).

In the present case we are not dealing solely with homology. The "similarity" in this case is predicated on alkyl substitution in one or both of two specific places in the reference Compound B. There are, however, eleven places to make such substitution, the prior art Compound C being one such possible combination of two substituents. Neither the examiner nor the board pointed to facts demonstrating that it would have been obvious to one of ordinary skill in this

art to make the substitution at those *particular* positions at which appellants have placed the substituents *so as to enhance the biological or pharmaceutical activity of the compound* instead of diminishing it as in Compound C.

[2, 3] Appellants by a verified showing have established that there was a known inferiority of the prior art Compound C as to its biological and pharmaceutical properties. They also have verified under oath the superiority of Compound A with relation to Compound B. It seems to us, therefore, that on this record appellants have carried a "burden of persuasion" which refutes any permissible "inference" of fact upon which to predicate a legal conclusion of obviousness under section 103. Factually unsupported *opinions* of board members and examiners do not provide the *factual* basis required by the Supreme Court in the *Deere* case for the determination of obviousness under section 103. Neither can they establish a "presumption" of obviousness. These subjective opinions are of little weight against contrary evidence.

As in the *Mills* case, the examiner and the board are here taking a position "predicated on nothing more than the 'legal presumption,'" 281 F.2d at 223, 47 CCPA at 1191. They seek to rely on *In re Herr*, 304 F.2d 906, 50 CCPA 705, as support for this position. However, in *Herr* the evidence of unexpected properties referred to properties not disclosed in the application. No such contention can be made here in view of the data included in appellants' disclosure.

It is appellants' position that:

Any permissible inference of [obviousness] * * * must be based on what the prior art suggests will result from the changes in molecular structure involved. * * *

Whether novel chemical compounds are patentable over prior art isomers and homologues, is a question to be determined in each case. In *re Hass*, 31 CCPA 903, 141 F.2d 127, 60 USPQ 548, 551.

Where the relationship of the claimed compound (Compound A) to the cited compound (Compound B) is the substitution of alkyl groups in specific places, an important fact to be considered is what result was obtained from alkyl substitution in the past.
* * *

The *fact* of record is that, while the cited art discloses the basic ring structure prior to appellants' invention, there also exists the *Tamm* reference which shows a related compound—the 5,6-dimethyl derivative (Compound C)—which is also an isomer of the 1, α -dimethyl derivative (Compound A) claimed herein. The reference further shows that the Relative Inhibitory Activity against poliomyelitis virus of this Compound C is 3.8 as against a figure of 78 for reference Compound B. It is thus about $\frac{1}{20}$ as potent in this use. The claimed 1, α -dimethyl derivative (Compound A) is by verified showing five times as potent as the reference Compound B in the same test. Compound A is shown on the present record to be about 100 times as active as its known isomer, Compound C.

The only teaching in the art dealing with the effect on the growth of polio virus of alkyl substitution in any of the eleven possible points of substitution in Compound B was improperly turned by the board into support for its decision that the prior art compound made the claimed invention obvious. They characterized this prior art teaching as "an isolated example whose diminished activity may in fact be its unexpected property." There is no factual basis in the record to support this characterization.

[4, 5] We think it is a fundamental requirement of the *Deere* decision that *all* the prior art teachings must be factually evaluated. Here this would include the compound of the *Tamm* reference. Considered as a part of the prior art, *Tamm* teaches that methyl substitution at certain positions can be expected to give diminished anti-viral activity. Appellants' teaching that certain claimed isomers enhances this activity is nowhere taught in the prior art and would, we

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think, be an unobvious teaching to one of ordinary skill in the art in view of the contrary indication in *Tamm*. Prior art teachings unfavorable to the Patent Office position may not be avoided by labeling them "unexpected" as one of ordinary skill in the art would evaluate them as a whole for what they fairly disclose. In *re Lunsford*, 357 F.2d 385, 53 CCPA 1011.

Neither the examiner nor the board has pointed to facts of record from which we can find that the prior art teachings suggest the claimed compounds will possess enhanced anti-viral activity. The only effort in this direction appears in the board's assertion that the Siegart compounds (Compounds D and E) support its position. However, since no physiological data are given for these compounds we are unable to determine what factual support they may provide for the board's position as to appellants' invention "as a whole."

We agree with the position in appellants' brief:

* * * That hydrogens can be replaced by methyl groups is so well known as to be apocryphal. [sic]. However, it needs more in the art than this to teach that putting an alkyl group on the α -carbon the one with the hydroxyl, in an α -hydroxybenzylbenzimidazole, will enhance the activity. Further, the Siegart reference makes no mention of substitution on the 1-nitrogen.

Where, as here, the substitution made by appellants is shown to be possible in a large number of positions, and one example of such substitution is shown in the prior art to be detrimental, and where there is no teaching in the art that the specific position of substitution here claimed would be beneficial, the comparison between all elements of the prior art and the claimed compound demonstrates no reasonable factual basis for the board's decision. Where the teaching of that art is that two methyl substituents on the basic ring structure is detrimental in the utility contemplated, and where as on the present record there is no

teaching that substitution in certain other spots is beneficial, one who teaches otherwise has made an unobvious contribution to the art.

To support its contrary position, the board held that the proven differences over the art do not establish "advantages which are differences in kind." Their cited precedent for this finding, In *re Lohr*, supra, has little relation to the facts of the present case as previously pointed out. In the *Lohr* record the evidence of improved results, i. e., the actual data, was criticized as being inconsistent with such a conclusion and therefore inconclusive as to unobviousness. The board has not here questioned the factual showing that improved results are achieved by the claimed invention.

[6, 7] We find nothing in section 103 which warrants the board's attempted dismissal of the differences between appellants' claimed compound and the prior art as not being "differences in kind," whatever this may mean. This phrase as here encountered is used by the board to infer that unless a "difference in kind" is found, the invention is obvious under section 103. Whether the difference between the claimed invention and the prior art is a difference "in kind" or a difference "in degree" is not mentioned in section 103. Section 103 simply requires a determination as to whether the invention as a whole would have been obvious to one of ordinary skill in the art at the time of appellants' invention. An unexpected increase in physiological activity may be persuasive evidence of unobviousness, In *re Grier*, 342 F.2d 120, 52 CCPA 1081. In all cases it is to be considered along with other evidence of unobviousness.

Here, we are not concerned with any finite degree of difference in physiologic activity as the determinative factor in resolving the issue of unobviousness under section 103. The difference in physiologic activity as shown in the record herein has been considered and evaluated along with all other evidence of record. Our legal conclusion is that the

facts of record do not supply a reasonable factual basis upon which to support the board's affirmance of the examiner's finding of obviousness of the claimed invention.² The decision of the board is therefore reversed.

Reversed.

WORLEY, C. J., concurs in the result.



54 CCPA

Application of CHI K. DIEN.

Patent Appeal No. 7686.

United States Court of Customs
and Patent Appeals.

Feb. 9, 1967.

Proceeding on application for patent in which the applicant appealed from decision of Patent Office, Serial No. 64,307, rejecting claims 1-19 of application. The Court of Customs and Patent Appeals, Rich, J., held that patent office improperly rejected, on ground of obviousness, claims 1-19 of application of patent relating to an improvement in process of preparing quinacridones.

Reversed.

Worley, C. J., dissenting.

Patents ⇌ 18

Patent office improperly rejected, on ground of obviousness, claims 1-19 of application of patent relating to an

2. The solicitor argues in his brief:

It is * * * submitted that even if the Court considers the comparative data to render claims 2, 3, 4, 7, 8 and 9, unobvious under 35 U.S.C. § 103, such data are not sufficiently representative of the properties of the compounds embraced by the claimed genus, as to render claim 1 similarly unobvious.

The examiner and the board made no such objection. Rather, the appealed

improvement in process of preparing quinacridones.

I. Harry Rosenberg, New York, for appellant.

Joseph Schimmel, Washington (Raymond E. Martin, Washington of counsel), for the Commissioner of Patents.

Before WORLEY, Chief Judge, SMITH and ALMOND, Judges, and WILLIAM H. KIRKPATRICK, Judge.

RICH, Judge.

This appeal is from a decision of the Patent Office Board of Appeals, affirmed on reconsideration, after the rejection of claims 1-19 of application serial No. 64,307, filed October 1960, entitled "Preparation of Quinacridones." No claim has been allowed.

The invention is an improvement in the process of preparing quinacridones. These compounds are prepared from diarylamino-terephthalic acids in a condensation reaction in which two molecules of water are eliminated and two rings are formed. The process is effected as a double ring-closure. "Ring-closing agents" may be employed. Applicant has discovered that improved ring-closure is effected by the use of polyphosphoric acid (PPA) as a ring-closing agent. The improved process is marked by very high yields (e. g., 98%), product purity, and other technological conveniences.

Claim 1 is typical:

1. The improvement in the process of preparing a quinacridone by double ring-closure of a 2,5-diarylamino

claims were considered together and we therefore decline to consider the relevancy and weight of the above reasoning in regard to the obviousness of the appealed claim 1.

* Senior District Judge, Eastern District of Pennsylvania, sitting by designation.

1. Consisting of Duncombe, Examiner, Chief, author of the opinion, and B. and Wyman, Acting Examiners-in-

capital stock taxes, transportation taxes, or any State and local taxes. (The treatment of State and local real and personal property taxes are covered in Article XIX, paragraph 33, of the Housing Contract.)

(d) The eligible builder shall promptly notify the Contracting Officer of all matters pertaining to Federal taxes that reasonably may result in either an increase or decrease in the contract price. The eligible builder shall take action as directed by the Contracting Officer, and the contract price shall be equitably adjusted to cover the cost of such action, including any interest, penalty, and reasonable attorney's fees, such adjustment to be processed as a change order.



57 CCPA

Application of David W. WILSON.**Patent Appeal No. 8271.**

United States Court of Customs
and Patent Appeals.

May 7, 1970.

Proceeding on patent application serial No. 332,321. The Patent Office Board of Appeals affirmed rejection of claims 1-4, 8-10, and 15-21, and applicant appealed. The Court of Customs and Patent Appeals, Lane, J., held that Patent Office Board of Appeals' disregard of term "incompatible" as used in claims relating to treatment of power driven rotary brushes with "incompatible" resins rendered its conclusion of obviousness unsupported.

Reversed.

1. Patents ©101(5)

Specification with respect to composition for treatment of power driven rotary brushes was sufficient to support claims in issue. 35 U.S.C.A. § 112.

2. Patents ©51(1)

All words in claim must be considered in judging patentability of claim against prior art. 35 U.S.C.A. § 103.

3. Patents ©18, 101(6)

If no reasonably definite meaning can be ascribed to certain terms in claim, subject matter does not become obvious, but claim becomes indefinite. 35 U.S.C.A. § 103.

4. Patents ©113(6)

Patent Office Board of Appeals' disregard of term "incompatible" as used in claims relating to treatment of power driven rotary brushes with "incompatible" resins rendered its conclusion of obviousness unsupported. 35 U.S.C.A. § 103.

Oberlin, Maky, Donnelly & Renner, William E. Thomson, Jr., John C. Oberlin, Cleveland, Ohio, attorneys of record, for appellant.

Joseph Schimmel, Washington, D. C., for the Commissioner of Patents. Raymond E. Martin, Washington, D. C., of counsel.

Before RICH, Acting Chief Judge, ALMOND, BALDWIN and LANE, Judges, and FORD, Judge, United States Customs Court, sitting by designation.

LANE, Judge.

This appeal is from the decision of the Patent Office Board of Appeals, which affirmed the rejection of claims 1-4, 8-10, and 15-21 in appellant's application serial No. 332,321, filed November 5, 1963, for "Treated Brush and Brush Treating Composition." Four other claims have been allowed. We conclude that the board's decision must be reversed.

THE DISCLOSURE

Appellant's disclosure discusses certain problems in the treatment of power-driven rotary brushes. According to the disclosure, it was desirable to pro-

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duce a composition for treating the brush bristles, whereby the ability of the bristles to hold abrasive particles would be enhanced. It discloses that the treatment composition should have a strength of adhesion to the brush bristles sufficiently great to prevent such composition from transferring excessively to the object being brushed; that the treatment material should wear at substantially the same rate as the brush bristles; that the material should have a high temperature softening point; and that the strength of adhesion between the treating composition and the abrasive particles must be sufficient to withstand the centrifugal force which normally would tend to throw the abrasive outwardly from the brush. The disclosure states that previously known brush-treating compositions did not accomplish all these objectives and had a tendency to dry and lose their tackiness over a period of time, thus becoming useless for holding abrasive particles on the bristles.

The disclosure states that appellant discovered that a composition having a high temperature softening point and a high degree of tackiness could be produced if a film-forming resin were blended with a tackifier resin which was incompatible with (insoluble in) the film-forming resin. The resulting composition would have two distinct phases: a continuous phase comprised of film-forming resin, either alone or saturated with a small quantity of tackifier resin, and a dispersed phase comprised of small particles of tackifier resin. The two resins may be either completely or partially incompatible, and the disclosure states that the more insoluble the resins, the greater the tack which the composition possesses. Appellant also disclosed that certain plasticizers could be added to render the resins more incompatible, thus further increasing the tack of the composition. Finally, appellant stated that the entire composition could be dissolved in a volatile solvent to allow easy application to the brush, the solvent

being one which quickly evaporates upon such application.

The specification contains a list of suitable film-forming resins, including ethyl cellulose, nitro cellulose, cellulose acetate, polyvinyl acetate and cis-polyisoprene, among other materials. A list of tackifiers is given, including certain esters of abietic acid, polyvinyl ethyl ether, coumarone indene resin and terpene resins. A list of plasticizers is also given. The specification then gives four examples showing how to combine various film-formers, tackifiers, plasticizers and solvents to obtain brush-treating compositions of the desired characteristics, and explains how to apply them to brushes.

THE CLAIMS

In view of the result we reach, we find that claims 1 and 8 are representative:

1. A two-phase brush treating composition having a high softening point and sufficient tack to retain abrasive material firmly adhered to brush fill material comprising a film-forming resin and a tackifier resin which is incompatible with said film-forming resin, said two phases comprising a continuous phase formed of said film-forming resin and a dispersed phase formed of small particles of tackifier resin.

8. In combination, a rotary brush having brush fill material and a two-phase pressure sensitive adhesive brush treating composition adhered thereto having a high softening point and sufficient tack to retain abrasive material firmly adhered to such brush fill material comprising a film-forming resin and a tackifier resin which is incompatible with said film-forming resin, said two phases comprising a continuous phase formed of said film-forming resin and a dispersed phase formed of small particles of tackifier resin.

The remaining claims on appeal are narrower, containing recitations of specific resins, plasticizers, etc.

THE PRIOR ART

Grantham¹ relates to coatings for film material and discloses a coating composition comprising a cellulose derivative film-former, a blending resin, a plasticizer, and an organic solvent. Grantham teaches that the blending agent and the film-former should be compatible.

Depew² teaches the preparation of emulsions consisting of a continuous phase of water and a discontinuous phase of elastomer particles and particles of a volatile hydrocarbon, with vulcanizing ingredients and other additives dispersed in the hydrocarbon particles. Depew then states that where a dispersion with additional adhesive properties is desired, an adhesive, such as certain of the tackifier resins disclosed by appellants, can be added to the emulsion, and that

[t]his adhesive can be water soluble or dispersed as particles. * * *

The chemistry of the adhesive component is not critical to this invention. The important thing is that the deposited film shall be tacky and adhesive.

Sergi³ relates to adhesives suitable for installation of floor-covering products such as linoleum. Sergi's composition consists of a tackifier resin dispersed in a latex binder; the tackifier and latex must be compatible with one another, according to the Sergi disclosure.

Vaughan⁴ teaches impregnating a fibrous buffing wheel with an aqueous emulsion consisting of a tacky resin and an emulsifier or stabilizer such as glue or gum.

THE BOARD

The board found the composition claims to be unpatentable over Depew, Sergi or Grantham under 35 U.S.C. § 103.

The board reached this conclusion after noting that each of the three references shows some of the film-formers, tackifiers, plasticizers and solvents appearing in appellant's lists. The board found that the recited limitation of incompatibility was too relative a term to distinguish over the compositions of the references.

The board found that the claims to the treated brush were unpatentable, under 35 U.S.C. § 103, over Vaughan in view of Sergi or Depew. Since Vaughan shows treating brushes, the board apparently considered it obvious to treat brushes with compositions which it thought were made obvious by Sergi or Depew.

The board also affirmed the rejection of certain claims for being "broader than the disclosure" under 35 U.S.C. § 112. The board's basis for this rejection was that the specification did not provide adequate guidelines for making a selection among the various disclosed ingredients, nor among other materials which are not disclosed but would be included by the claims.

OPINION

[1] We first treat the rejection under section 112. This rejection is in effect an attack on the specification as being insufficient to teach how to practice the broad invention claimed. The rejection is therefore under the first paragraph of section 112. The board's position, as mentioned above, was that the specification did not teach how to select ingredients so that the desired incompatibility would result. We disagree with the board's position on this point. First of all, appellant provided four examples, each specifying the nature and amounts of materials to be used. Secondly, the record indicates that it involves only routine experimentation to find out which resins are incompatible. The examiner admitted as much when,

1. U.S.Pat. 3,051,670, issued August 28, 1962.

2. U.S.Pat. 2,933,469, issued April 19, 1960.

3. U.S.Pat. 3,015,638, issued January 2, 1962.

4. U.S.Pat. 2,890,136, issued June 9, 1959.

with regard to obviousness, he said "selecting the proper tackifier and film-forming resin from those listed in the references to form an emulsion or two-phase composition would be within the expected skill of the art and would merely involve routine experimentation." We conclude that appellant has provided a sufficient specification to support the claims here in issue.

[2-4] Turning to the rejection of the claims for obviousness, we again disagree with the board's position. The board has disregarded the term "incompatible," as used in the claims, because it is "too relative" to distinguish over the compositions of the references. Appellant contends this limitation is essential in defining his invention. There has been no rejection here for indefiniteness, under the second paragraph of section 112. Rather than reject the claims as indefinite, the board chose to ignore the language it considered indefinite, and proceeded as though that language were not in the claims. The board said, in effect, that since we do not know what "incompatible" means, and the rest of the claim defines obvious subject matter, there is no basis for concluding unobviousness. This reasoning is incorrect. All words in a claim must be considered in judging the patentability of that claim against the prior art. If no reasonably definite meaning can be ascribed to certain terms in the claim, the subject matter does not become obvious—the claim becomes indefinite. In the present case, we think the term "incompatible" is defined with reasonable definiteness in the specification. While it is true that the word is not perfectly precise, under the circumstances of the present case there appears to be no other way for appellant to describe his discovery. In any event, the ignoring of this term by the board renders its conclusion of obviousness unsupported. None of the references discloses a two-phase composition of incompatible resins or suggests that such a composition would have the properties disclosed by appellant. Grantham and Sergi both ex-

pressly teach that the components of their compositions should be compatible. Neither Vaughan nor Depew uses a resin as the continuous phase. While Depew states, as quoted above, that the adhesive material may be dispersed as particles in the continuous phase, and hence be incompatible with the continuous phase material, it cannot be ignored that Depew's continuous phase is of water, not a film-forming resin as recited in appellant's claims. Furthermore, there is no suggestion in Depew or Vaughan that there are advantages in using an adhesive which is insoluble in the aqueous phase. There is nothing of record, therefore, from which we can properly conclude that the subject matter of appellant's claims would have been obvious at the time of his invention. The decision of the board must accordingly be reversed.

Reversed.



57 CCPA

COSMETICALLY YOURS, INC.,
Appellant,

v.

CLAIROL INCORPORATED, Appellee.
Patent Appeal No. 8296.

United States Court of Customs
and Patent Appeals.

May 7, 1970.

Appeal from decision of the Trademark Trial and Appeal Board, Opposition No. 44,363, sustaining an opposition to the application by appellant to the registration of the words "Look Alive" as a trademark for "lipstick". The Court of Customs and Patent Appeals, Rosenstein, J., held that absent a counterclaim for cancellation, it was not open to applicant to prove abandonment of opposer's registered "Come Alive" mark;

Application of Stephen F. ROYKA
and Robert G. Martin.
Patent Appeal No. 9092.

United States Court of Customs
and Patent Appeals.
Feb. 7, 1974.

Appeal from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of patent application, Serial No. 648,701, for a "responsive answer system." The Court of Customs and Patent Appeals, Rich, J., held that an answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by an erasure, both being legible so that a student, seeing a choice of answers to a question, was required to make a selection, the correctness of the selection being shown by the information which was then removed by the erasure, was not anticipated by prior patents and was therefore patentable.

Reversed.

Patents \S 66(1.20)

"Responsive answer system," answer sheet for use in self-instruction and testing, in which were printed in "response areas" meaningful information in permanent printing and confusing information in printing which could be removed, as by erasure, both being legible so that student, seeing choice of answers to question, was required to make selection, correctness of selection being shown by information which was then removed by erasure, was not anticipated by prior patents and was therefore patentable. 35 U.S.C.A. $\S\S$ 102, 103.

Michael H. Shanahan, Rochester, N. Y., of record, for appellant; Thomas M. Webster, Rochester, N. Y., Boris Haskell, Washington, D. C. (Paris, Haskell & Levine), Washington, D. C., of counsel.

Joseph F. Nakamura, Washington, D. C., for the Commissioner of Patents. Fred W. Sherling, Washington, D. C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, Judges.

RICH, Judge.

This appeal is from the decision of the Patent Office Board of Appeals affirming the examiner's rejection of claims 28 and 30-36 of application serial No. 648,701, filed June 26, 1967, entitled "Responsive Answer System." We reverse.

The Invention

The appealed claims are directed to a device in the nature of an answer sheet for use in self-instruction and testing. The answer sheet may be associated with questions or separate therefrom. The essential features of the invention are that there are printed on the answer sheet in "response areas" meaningful information in permanent printing and confusing information in printing which can be removed, as by an eraser, both being legible so that a student, seeing a choice of answers to a question, must make a selection. Having made a selection, he then applies an eraser to the selected response area and some of the information will be readily removed. What remains advises him of the correctness or otherwise of his answer. The following figures from the drawings are illustrative:

PERMANENT MEANINGFUL
INFORMATION PLUS REMOV-
ABLE CONFUSING INFORMA-
TION.

PERMANENT MEANINGFUL
INFORMATION

A. TRUE
YES
WRONG

A. YES

B. FALSE
YES
RIGHT

B. NO

FIG. 1A

FIG. 1B

Fig. 1A shows two response areas to a given question before any removing ac-

tion by the student has taken place and Fig. 1B shows the permanent information remaining in each after erasure of the removable information. Of course, if the student makes an initial choice of area A, showing up "YES" or some other indication of a correct answer, he will not need to proceed further and erase the B area. In a modified form of the invention, a wrong selection, plus erasure, may expose, instead of or in addition to a statement that the answer is wrong, a number or other reference to further material which is to be studied.

A preferred method of printing the permanent meaningful information and the removable confusing information is by that type of xerography in which a fusible toner is used, the permanence of the printing depending on the extent to which the toner image is "fixed" or fused by heat. By successive printings of the two kinds of information with fixing to different degrees, one image can be made permanent and the other made subject to easy removal, both images retaining such similarity of appearance that the user of the answer sheet cannot tell them apart.

Claim 28 is the principal claim, all others being dependent thereon, and reads as follows:

28. A device for selectively indicating information comprising

a support having response areas for presenting information for selection, permanent printing indicative of meaningful information permanently fixed to said support within a response area, and

removable printing indicative of confusing information removably fixed to said support within a response area,

said meaningful and confusing information being substantially legible even when said permanent and removable printing are fixed over one another on said support,

said permanent and removable printing being substantially similar such that an observer cannot determine

which information is permanent and which is removable

whereby the information within a response area is selected by attempting to remove the printing therein with the failure to remove printing identifying meaningful information.

Claims 30-36 add limitations which need not be considered except for noting that claims 33 and 34 alone specify the use of a xerographic toner, for which reason they were rejected on a different ground from the other claims.

The Rejection

The following references were relied on:

Reid et al. (Reid)	356,695	Jan. 25, 1887
Bernstein et al. (Bernstein)	3,055,117	Sep. 25, 1962
Lein et al. (Lein)	3,364,857	Jan. 23, 1968 (filed Feb. 2, 1966)

Claims 28, 30, 31, and 32 were rejected as anticipated under 35 U.S.C. § 102 by Bernstein; claims 28, 31, 32, 35, and 36 were rejected as anticipated under § 102 by Reid; and claims 33 and 34 were rejected under 35 U.S.C. § 103 for obviousness, on either Bernstein or Reid in view of Lein. These were the examiner's rejections and the board affirmed them, adhering to its decision on reconsideration.

Bernstein discloses an answer sheet in which printed information representing a response is "temporarily concealed from the observer" and he discloses a number of different ways of effectively concealing the response. His specification states:

The objects of the invention are accomplished by utilizing the hiding media to confuse the participant and to render the response and the hiding media indistinguishable and thus conceal the presence, absence, nature or position of the response from the participant. This may be effectuated by careful attention being paid to a number of factors including the design,

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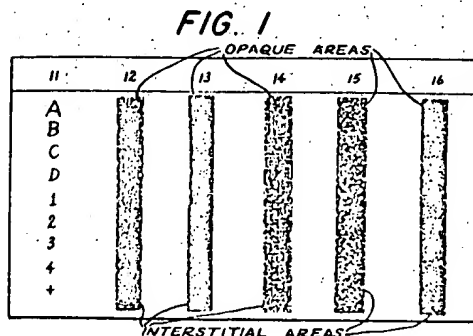
2 were rejected
U.S.C. § 102 by
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confusing media.

Fig. 1 of Bernstein's drawings, illus-
trates some of his concealing means:



The following is the written description:

Referring now to the drawing, FIG. 1 illustrates some of the many optical-ly confusing patterns which may be positioned between the printed structure to be concealed and the point of observation. Column 11 shows the information which is to be concealed. This information is repeated in columns 12 through 16 but in each case is concealed by a pattern in accordance with the present invention. Column 12 utilizes a pattern comprising an alphabetical maze in both line and half tone screen. Column 13 utilizes a pattern comprising an absorbing field having a plurality of irregular dot-like interstices. Column 14 utilizes a pattern comprising a maze of plus signs combined with dots. Columns 15 and 16 illustrate irregular and non-repetitious patterns.

Bernstein says that if at least 50% of the response is actually covered by the opaque portions of the confusion pattern, complete concealment is obtained. He also says that added means of concealment may be used, such as scoring and embossing and perforating the paper in order to scatter the light or let it shine through.

Reid is entitled "Transformation Picture and Print." The invention is said to be useful for advertisements, Christmas cards, birthday cards, valentines, and the like and as a source of amuse-

ment and instruction for children. It consists of a picture or print, part of which is permanently printed and part of which is removable from the paper on which it is printed. For the latter various soluble undercoatings or inks are described. If the picture is washed with a solvent, which may be water, the removable part disappears and the pictorial and/or typographic matter changes. The invention is illustrated by a typical nineteenth century temperance propaganda piece depicting the evils of drink. In the finished picture there are three scenes from left to right: Scene 1, the innocent child leads her father home from the pub; Scene 2, Father sits slumped in the kitchen chair with his bottle beside him, the family wash hanging above his head, this picture being entitled "The Effects of Drink"; Scene 3, Mother stands in front of a sign reading "Pawn Shop." Across the bottom of the picture is a legend which says "Wash the above and see what water will do." Fig. II shows the result of washing with water: Scene 1, a handsome young man and his happy daughter stroll on the street; Scene 2, Father sits erect in a well-appointed room at a cloth-covered table, apparently having a cup of tea, obviously a gentleman; Scene 3, Mother beams from the sideline and the Pawn Shop sign has vanished. Two new subscriptions appear and the words "The" and "Drink" have disappeared, the resultant being a new picture title reading "The Beneficial Effects of Temperance." "The Beneficial" and "Temperance" were covered by some soluble opaque in the original picture. No doubt the overall effect is instruction. Perhaps there was amusement in bringing about the transformation.

Lein relates to xerography and is relied on only for its disclosure of the removability of partially fused toner and the permanence of fully fused toner.

OPINION

As to the § 102 anticipation rejections, it will suffice to consider independent claim 28. If it is not fully met by Reid

or Bernstein; neither are the more limited dependent claims. It is elementary that to support an anticipation rejection, all elements of the claim must be found in the reference. We do not find claim 28 anticipated by Bernstein because, as we read the claim, it requires the display of *legible* meaningful and *legible* confusing *information* simultaneously, between which the user of the device may make a selection before he undertakes to remove any of the information from the response area selected by him. The element we find most clearly missing, contrary to the reasoning of the examiner and the board, is the legible confusing *information*. The Patent Office proposes to read this limitation on Bernstein's confusion patterns which are nothing but meaningless obscuring screens, conveying no information and providing the user with no basis for making a *selection*, as called for by claim 28. In appellants' device the legible confusing information—i. e., the wrong answers—are legible in the sense that they can be read as intelligible words, not merely a jumble of type serving to obscure the words of the wrong answers.

Appellants were fully aware of Bernstein and discussed its disclosures in their specification, distinguishing from this and other prior art, saying, in part:

The inventive concept hereof confuses not by physical blocking as taught by the prior art, but by compounding, associating (including disarranging) permanent information with confusing information, usually at least some of which is similar in character to the permanent information as to render it impossible to tell which is permanent and which is removable confusing information. In the invention, generally no attempt is made to de-designedly physically cover the permanent information, but to confuse it beyond interpretation by the presentation of extraneous removable, confusing information.

Claims are not to be read in a vacuum and while it is true they are to be given

the broadest *reasonable* interpretation during prosecution, their terms still have to be given the meaning called for by the specification of which they form a part. We cannot read the terms "legible" and "information" on Bernstein's confusion patterns, as did the examiner and the board. They are not "legible," as appellants use the term, and they convey no information.

As to anticipation by Reid, we find neither appellants' basic concept nor the substance of claim 28 to be disclosed. Apparently the solicitor could find little to support the rejection in Reid for all he says in his brief—so far as claim 28 is concerned—is:

Reid discloses a sheet which may be used for instruction and which may have a removable design partly covering a fixed design * * *. Therefore, the disclosure of the reference encompasses the arrangement wherein a removable design covers a fixed design with both designs being substantially legible.

But claim 28 does not call for an arrangement wherein a removable design covers a fixed design. It calls for response areas, which Reid does not have, containing meaningful information in permanent printing together with removable printing conveying confusing information, both legible at the same time, between which a "selection" can be made. The only choice offered to the user by Reid is to follow the instruction to wash the whole visible picture with water or other solvent, thus removing the overprinting, to discover what the permanent picture is. The Patent Office attempt to read claim 28 on this reference is a tour de force. We hold that Reid does not anticipate for failure to meet the limitations of claim 28 to "response areas," to the presentation of two categories of information (meaningful-permanent and removable-confusing) within such areas, and the possibility of selection. Anticipation requires a finding that the claimed invention be disclosed. It is not enough to say that appellants' invention and the reference are

both usable for instruction and both consist of permanent and removable printings on paper, as did the solicitor.

The dependent claims rejected with claim 28, as anticipated under § 102, are not anticipated since claim 28 is not anticipated. Some of them merely add features which are disclosed by the references and some do not. Insofar as they do not, they further negative anticipation. The examiner recognized this fact as to claims 33 and 34, which are limited to xerography, and therefore did not reject them under § 102. Similarly, he did not reject claim 30 on Reid or claims 35 and 36 on Bernstein. We find that claims 35 and 36 contain limitations which additionally distinguish from Reid. We have already noted that Reid has no "response areas" as required by claim 28 and so Reid does not disclose the structure of claim 35 which additionally requires both the correct and incorrect answers to appear within the same response area.

As to claim 36, the examiner said it "is merely a printed matter variation of the design of the reference," Reid. This is not a valid reason for rejection. Printed matter may very well constitute structural limitations upon which patentability can be predicated. We have commented on this matter in *re Jones*, 373 F.2d 1007, 54 CCPA 1218 (1967); and in *re Miller*, 418 F.2d 1392, 57 CCPA 809 (1969), and will not repeat ourselves. The limitations of claim 36 are not remotely suggested by Reid.

There remains the § 103 rejection of claims 33 and 34. Do they, taken together with all of the limitations of claim 28 from which they depend, define obvious subject matter? The difference between claim 28 and these two dependent claims is that they add the limitations to xerography. If Bernstein and Reid showed the claimed invention except for xerography, the addition of the Lein reference would make the subject matter of the claims obvious. But that is not the situation here. Adding the knowledge of xerographic technology to Bernstein or Reid still does not make the

invention of claims 33 and 34 obvious for the same reasons we have given above in discussing anticipation. The essence of appellants' invention, as set forth in claim 28, is still missing notwithstanding the addition of the Lein reference and we see nothing in the combinations of references which would have made the invention obvious to one of ordinary skill in the art at the time it was made. We will, therefore, reverse this rejection.

The decision of the board is *reversed*.
Reversed.



CHRYSLER CORPORATION, Plaintiff-Appellant,

v.

John T. DUNLOP, Director Cost of Living Council, et al., Defendants-Appellees.

No. DC-18.

Temporary Emergency Court of Appeals.
Dec. 5, 1973.

In manufacturer's action for declaratory and injunctive relief with respect to order of the Cost of Living Council deferring consideration of the merits of manufacturer's proposed price increase, the United States District Court for the District of Columbia, Barrington D. Parker, J., denied preliminary injunction, and manufacturer appealed. The Temporary Emergency Court of Appeals held that if the order was not supported by substantial evidence, manufacturer would have substantial likelihood of prevailing on the merits, that the trial court should have made findings of fact and conclusions of law on the question of whether the order was supported by substantial evidence, and that the trial court should consider manufacturer's proposal that it would escrow all moneys

Application of John H. WERTHEIM
et al.

Patent Appeal No. 75-536.

United States Court of Customs,
and Patent Appeals.

Aug. 26, 1976.

Applicant for patent serial No. 96,285, with respect to a process for making freeze-dried instant coffee appealed from a decision of the Patent and Trademark Office Board of Appeals affirming the rejection of all claims in application. The appeal as to certain claims was withdrawn. The Court of Customs and Patent Appeals, Rich, J., held that certain claims were entitled to the benefit of the earlier filing date of Swiss application of applicants and were therefore improperly rejected while certain other claims were not entitled to such earlier filing date and were properly rejected and that certain other claims were properly rejected on ground of obviousness in view of prior art while other claims were improperly rejected on grounds of obviousness.

Affirmed in part and reversed in part.

Baldwin, J., filed an opinion concurring in part and dissenting in part.

Miller, J., filed an opinion dissenting in part and concurring in part.

1. Patents ⇐ 90(1)

If patent applicants' parent and Swiss applications complied with specification statute, including description requirement, as to the subject matter of the interference claims, the claims were entitled to filing dates of parent application and Swiss application. 35 U.S.C.A. §§ 112, 119, 120.

2. Patents ⇐ 101(5)

Function of description requirement with respect to application is to ensure that inventor had possession, as of filing date of application relied on, of specific subject matter later claimed by him; how specification accomplishes this is not material. 35 U.S.C.A. § 112.

3. Patents ⇐ 101(5)

It is not necessary that application for patent describe claim limitations exactly but only so clearly that persons of ordinary skill in the art will recognize from disclosure that applicants invented processes including those limitations. 35 U.S.C.A. § 112.

4. Patents ⇐ 101(5)

In determining compliance with description requirement of statute with respect to limitations, the primary consideration is factual and depends on nature of invention and amount of knowledge imparted to those skilled in the art by the disclosure. 35 U.S.C.A. § 112.

5. Patents ⇐ 113(7)

On appeal from decision of patent and trademark office board of appeals affirming final rejection of claim, PTO had initial burden of presenting evidence of reasons that persons skilled in art would not have recognized in disclosure a description of invention defined by claims, and by pointing to fact that the claim read on embodiments outside scope of description the PTO satisfied its burden. 35 U.S.C.A. § 112.

6. Patents ⇐ 101(2)

Where Swiss application on which applicant for continuation patent relied was filed prior to issuance of United States patent, for purpose of statute relating to specifications in patent application the United States patent disclosure was not evidence of what those skilled in art considered conventional at the time Swiss application was filed. 35 U.S.C.A. § 112.

7. Patents ⇐ 90(1)

Claims 1 and 4 of application relating to method for making freeze-dried instant coffee were not entitled to benefit of filing date of applicants' earlier Swiss application for patent since the claims in instant application relied on embodiments employing solids content outside range described in Swiss application.

8. Patents ⇐ 101(5)

Where it is clear that the broad described range pertains to a different inven-

Section 355, Com-

ls did not request
dings, the court's
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Moore-McCormack
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ico court quoted with
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NUMBER SYSTEM

ion 21-1-1 (Rule 54(c)),
federal Rule 54(c).

tion than narrower claimed range, then broader range does not describe narrower range for purpose of statute relating to specifications in application for patent. 35 U.S.C.A. § 112.

9. Patents ⇐66(1.24), 90(1)

Claims 2, 37 and 38 of patent application relating to process for making freeze-dried instant coffee claiming a solids content range within the described broad range of Swiss application were entitled to benefit of the filing date of the Swiss application which antedated the United States patent, which was not available as a prior art of its 1966 date, so that rejection of such claims was improper. 35 U.S.C.A. §§ 102(e), 103, 112.

10. Patents ⇐101(11)

Claims 6-10, 12-15, 17, and 26 relating to application for patent for making freeze-dried instant coffee were improperly rejected on ground that limitation of particle size was not described in application as originally filed and was added to the application in violation of statute, since the originally filed specification clearly conveyed to those of ordinary skill in art that applicants invented process in which the particles were of particular size. 35 U.S.C.A. § 132.

11. Patents ⇐51(1)

Disclosure in prior art of any value within a claimed range is an anticipation of the claimed range. 35 U.S.C.A. § 103.

12. Patents ⇐18

With respect to patent application relating to process for making freeze-dried instant coffee, claims 6-14, 16, and 21-28 were properly rejected on ground of obviousness in view of the prior art while process claims 17-20 and 29 were improperly rejected on grounds of obviousness. 35 U.S.C.A. § 103.

13. Patents ⇐18

Apparatus claims 30-35 of application for patent, with respect to a process for

1. A continuation (or continuation-in-part, as the examiner has required it to be denominated) of application serial No. 537,679, filed March 28, 1966. Appellants claim the benefit of a Swiss application filed April 2, 1965. The

making freeze-dried instant coffee were properly rejected on grounds of obviousness in view of prior art. 35 U.S.C.A. § 103.

14. Patents ⇐18

Patent claims 15 and 40-43 of application for patent relating to process for making freeze-dried instant coffee were properly rejected for obviousness in view of prior art.

William H. Vogt, III, Watson, Leavenworth, Kelton & Taggart, New York City, attys. of record, for appellants; Paul E. O'Donnell, Jr., New York City, of counsel.

Joseph F. Nakamura, Washington, D. C., for the Commissioner of Patents; Gerald H. Bjorge, Washington, D. C., of counsel.

Before MARKEY, Chief Judge, and RICH, BALDWIN, LANE and MILLER, Judges.

RICH, Judge.

This appeal is from the decision of the Patent and Trademark Office (PTO) Board of Appeals affirming the final rejection of claims 1-43, all the claims in application serial No. 96,285, filed December 8, 1970, entitled "Drying Method."¹ The appeal on claims 3, 5, 36, and 39 has been withdrawn, and as to these claims it is, therefore, dismissed. As to the remaining claims, we affirm in part and reverse in part.

The Invention

Appellants' invention centers around a process for making freeze-dried instant coffee. Claims 1, 6, 30, and 40 are illustrative:

1. An improved process for minimizing loss of volatiles during freeze-drying of coffee extract which comprises obtaining coffee extract, concentrating said extract to a higher solids level of at least 35%, foaming said concentrated extract

title of the application on appeal is somewhat inaccurate, as the application contains claims to apparatus for drying and dried instant coffee products as well as to a drying method.

ied instant coffee were on-grounds of obviousness art. 35 U.S.C.A. § 103.

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Taggart, New York City,
for appellants; Paul E.
w York City, of counsel.
mura, Washington, D. C.,
ner of Patents; Gerald H.
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EY, Chief Judge, and
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Invention

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to a substantial overrun by injection of a
gas into said extract at at least atmo-
spheric pressure to thereby avoid evapo-
rative cooling due to evaporation of
water in said extract during said foam-
ing, freezing said foam to below its eutec-
tic point at at least atmospheric pressure
while avoiding evaporative cooling, and
freeze-drying said extract at below the
eutectic temperature of said extract.

6. Process for preparing a powdered
coffee extract, which comprises adding
sufficient inert gas to a concentrated
aqueous extract of roast coffee contain-
ing about 25% to 60% by weight of solu-
ble coffee solids to provide a foam having
a density between about 0.4 and 0.8
gm/cc, freezing the foamed extract to a
solid mass, grinding the frozen foam to a
particle size of at least 0.25 mm and
freeze drying the ground frozen foam.

30. An apparatus for carrying out the
process defined in claim 6 comprising, in
combination, means for foaming, a closed
chamber capable of being maintained at a
temperature which is substantially below
the melting temperature of said frozen
foam, and, disposed within said chamber,
a movable endless belt, means for moving
said belt at a low speed, a spreading
device for distributing coffee extract
foam on said belt and refrigerating
means for cooling at least one surface of
said belt with a liquid refrigerant.

40. A dry coffee powder comprising a
freeze-dried particulated foamed extract
of roast and ground coffee, the foam
before freeze drying having a density be-
tween about 0.4 and 0.8 gm/cc.

The remaining claims are reproduced in the
Appendix hereto. Appellants assert that
their invention produces an instant coffee
having a bulk density of 0.2-0.3 gm/cc,
which corresponds to that of conventional
spray-dried instant coffee.² They allege
they discovered that this desired bulk densi-

ty results from controlling the solids con-
tent of the concentrated extract prior to
foaming and the density of the foam gener-
ated therefrom within the ranges of their
freeze-drying process claims.

Since the claims are somewhat elliptical
in setting out the steps of appellants' proc-
ess, we shall describe it further. An aque-
ous extract of coffee is prepared by perco-
lating hot water through roasted and
ground coffee beans. The extract is con-
centrated to have a solids content between
25% and 60% and is then charged with gas
to produce a foam having a density be-
tween 0.4 and 0.8 gm/cc. The foam is
frozen and ground into particles, preferably
0.25 to 2.0 mm in size, which are freeze-
dried by conventional techniques.

Prosecution History and Rejections

The claims which remain on appeal fall
into two broad groups: The "interference"
claims 1, 2, 4, 37, and 38; and the "non-in-
terference" claims, 6-35 and 40-43.

As originally filed, the application con-
tained claims 1-5 copied from Pfluger et al.
U. S. Patent No. 3,482,990 (Pfluger patent),
issued December 9, 1969, on an application
filed February 10, 1969. A letter under
Rule 205(a), 37 CFR 1.205(a), requesting an
interference with the Pfluger patent ac-
companied the application. By amendment,
appellants transferred claims 6-35 from
their 1966 application to the instant applica-
tion. Claims 36-39, added by amendment,
are modified versions of the previously cop-
ied claims and were presented for the pur-
pose of providing a basis for phantom
counts in an interference with the Pfluger
patent under Rule 205(a) and Manual of
Patent Examining Procedure § 1101.02.
They depend from claim 2.

2. So that consumers may continue to use the
same amount of freeze-dried instant coffee per
cup as conventional instant coffee without

change in the strength of the beverage that
they are accustomed to.

The patents relied on by the examiner are:

Pfluger et al.	3,482,990	Dec. 9, 1969
De George	3,253,420	May 31, 1966
	(application filed Feb. 3, 1965)	
Carpenter et al.	2,974,497	Mar. 14, 1961
British patent	948,517	Feb. 5, 1964

The Pfluger patent issued on a chain of four applications: serial No. 800,353, filed Feb. 10, 1969, which was a continuation of serial No. 520,347, filed Jan. 13, 1966 (Pfluger 1966), which was a continuation-in-part of serial No. 309,410, filed Sept. 17, 1963 (Pfluger 1963), which was a continuation-in-part of serial No. 98,007, filed Mar. 24, 1961. The Pfluger patent discloses a process for making freeze-dried instant coffee which has as its goal minimizing the loss from a foamed extract of volatile aromatics which contribute substantially to the natural flavor of coffee and other foods.

De George describes apparatus and methods for freezing liquid, unfoamed coffee extract prior to drying on continuous belts refrigerated by brine tanks contacting the bottom surfaces of the belts. The claims of De George are directed to processes for facilitating the removal of the frozen sheet of coffee extract from the belt before it is freeze dried.

The British patent discloses a rapid freeze-drying process in which the food product is frozen, milled into small particles which are spread from a hopper in single-particle layers onto plates, and freeze-dried in a vacuum chamber. More details of the disclosure are supplied infra.

Carpenter discloses the cooling of a refrigeration belt by spraying cold brine onto the underside of the belt.

3. 37 CFR 1.204(c):

When the effective filing date of an applicant is more than 3 months subsequent to the effective filing date of the patentee, the applicant, before the interference will be declared, shall file two copies of affidavits or declarations by himself, if possible, and by one or more corroborating witnesses, supported by documentary evidence if available, each setting out a factual description of acts and circumstances performed or observed by the affiant, which collectively would prima

The examiner made multiple rejections which were addressed by the board in eight categories, seven of which are before us for review. Category I covers the "interference" claims, which were rejected on the Pfluger patent, claims 1, 2, and 4 under 35 U.S.C. § 102 and claims 37 and 38 under § 103. The board agreed with the examiner's position that these claims were not entitled to the benefit of appellants' 1965 Swiss priority date because they were not supported by appellants' parent and Swiss applications. The limitations held to be unsupported were "at least 35% [solids content]" in claim 1, "between 35% and 60% soluble solids" in claims 2 and 4, and "pressure of less than 500 microns" and "final product temperature of less than 110°F." in claim 4. For that reason appellants were held to be junior to the Pfluger patent on the basis of Pfluger's 1966 filing date. In light of appellants' refusal to file a Rule 204(c)³ affidavit showing a date of invention prior to Pfluger's 1966 filing date, the examiner and the board held the Pfluger patent to be prior art under § 102(e) against claims 1, 2, 4, 37, and 38 and rejected the claims on that basis.⁴ The board refused to hold that the claims were supported in the parent and Swiss applications, "for interference purposes," under our decision in *In re Waymouth*, 486 F.2d 1058, 179 USPQ 627 (Cust. & Pat.App.1973), *mod. on reh.*, 489 F.2d 1297, 180 USPQ 453 (CCPA 1974). The board stated that appellants' failure to file a Rule 204(c) affidavit precluded any attempt to get into an interference and that *Waymouth*, which concerned the right to make a claim for interference purposes in the application on appeal, was therefore inapplicable to this case.

facie entitle him to an award of priority with respect to the effective filing date of the patent. This showing must be accompanied by an explanation of the basis on which he believes that the facts set forth would overcome the effective filing date of the patent.

4. The examiner and the board did not rely on Pfluger 1963 because the solids content and foam density ranges of the copied claims were not described in that application. *In re Lund*, 376 F.2d 982, 54 CCPA 1361, 153 USPQ 625 (1967).

Cite as 541 F.2d 257 (1976)

made multiple rejections issued by the board in eight of which are before us for Category I covers the "interference" which were rejected on the claims 1, 2, and 4 under 35 U.S.C. § 103 and 37 and 38 under 35 U.S.C. § 102(e) agreed with the examiner that these claims were not entitled to the benefit of appellants' 1965 application because they were not disclosed in appellants' parent and Swiss applications. The limitations held to be unpatentable were "at least 35% [solids content], "between 35% and 60% [solids content], claims 2 and 4, and "pressure of 500 microns" and "final temperature of less than 110°F." in the instant case appellants were not entitled to the Pfluger patent on the basis of Pfluger's 1966 filing date. In appellants' refusal to file a Rule 135 showing a date of invention, Pfluger's 1966 filing date, the examiner held the Pfluger patent in part under § 102(e) against claims 1, 2, and 38 and rejected the claims. The board refused to reverse the rejections. The claims were supported in the instant applications, "for interference" under our decision in *In re Pfluger*, 442 F.2d 1058, 179 USPQ 627 (CA-9, 1971), *mod. on reh.*, 489 USPQ 453 (CCPA 1974). That appellants' failure to file an affidavit precluded any finding of an interference and which concerned the right to a patent for interference purposes. On appeal, was therefore affirmed in this case.

entitled to an award of priority with the effective filing date of the patenting must be accompanied by evidence of the basis on which he believes the facts set forth would overcome the prior art. The board did not rely on the cause the solids content and gases of the copied claims were that application. *In re Lund*, 442 F.2d 1361, 153 USPQ 625

Under Category II, the board affirmed the rejection of claims 6-10, 12-15, 17, and 26 under 35 U.S.C. § 132 for new matter. The board held that these claims, which were added to the instant application by amendment, were not supported in the original disclosure for lack of a description of the claimed size of the ground foam particles, i. e., "at least 0.25 mm."

The Category III rejection was reversed by the board.

In Category IV, claims 6-8, 11-20, and 40-43 were rejected under § 103 on the disclosure of Pfluger 1963⁵ carried forward to the Pfluger patent, in accordance with *In re Lund*, supra. The board found that the foam density range of 0.4-0.8 gm/cc claimed by appellants (and the 0.6-0.8 gm/cc range in claims 19 and 20) was suggested by Pfluger 1963's disclosure of 0.1-0.5 gm/cc foam density and that Pfluger 1963 teaches the use of foaming gases and concentrating the coffee extract prior to foaming. The board found that the final product densities claimed would be inherent "in view of the same foam overrun density disclosed by Pfluger" and that Pfluger's example I, which discloses breaking the frozen foam strands into 1/4" lengths (i. e., "at least 0.25 mm") before drying, would suggest the size of the ground foam particles claimed by appellants.

Category V added De George to the § 103 rejection of claims 9, 10, 30, and 32-35. The board agreed with the examiner that the temperatures, foam thicknesses, and belt lengths and speeds covered by these claims are disclosed in De George, and that it would be obvious to use De George's moving belt apparatus in the Pfluger process.

In Category VI claims 21-23 and 26-29 were rejected under § 103 on Pfluger in view of the British patent, which was relied on for its teaching of the concentration of coffee extract by freezing to a solids content of 27 to 28%. Pfluger was applied to

5. Peebles U. S. patent No. 2,897,084, issued July 28, 1959, was cited against claims 19 and 20 to show that agglomerating fine dried coffee particles into larger grounds was old in the art.

the claims under the rationale employed in Category IV.

Category VII was the rejection of claims 24 and 25 under § 103 on Pfluger, the British patent, and De George, which was relied on to show "the deposition of a coffee extract on a moving belt prior to grinding and freeze drying." The board otherwise relied on the reasoning in Categories V and VI.

Under Category VIII claim 31 was rejected on Pfluger and De George under § 103 for the reasons of Category V, with reliance on Carpenter to show refrigeration of the belt by spraying refrigerant onto the bottom of the belt instead of using De George's brine tanks.

OPINION

The "Interference" Claims—1, 2, 4, 37, and 38

[1] The dispositive issue under this heading is whether appellants' parent and Swiss applications comply with 35 U.S.C. § 112, first paragraph, including the description requirement, as to the subject matter of these claims. If they do, these claims are entitled to the filing dates of the parent application under 35 U.S.C. § 120; *In re Lukach*, 442 F.2d 967, 58 CCPA 1233, 169 USPQ 795 (1971), and the Swiss application under 35 U.S.C. § 119, *Kawai v. Metlesics*, 480 F.2d 880, 887-88, 178 USPQ 158, 164 (Cust. & Pat.App.1973). Since the PTO relies only on Pfluger 1966 to provide the effective U.S. filing date of the patent as a reference against these claims under §§ 102(e) and 103, a right of foreign priority in appellants' Swiss application will antedate Pfluger 1966 and remove it as prior art against the claims.

The only defect asserted below in appellants' parent and Swiss application disclosures that covers all these claims is that the applications do not contain written descriptions of the solids content limitations of the

Appellants have acknowledged this to be true, so it is not necessary to discuss Peebles further.

concentrated extract prior to foaming, i. e., "at least 35%" (claim 1) and "between 35% and 60%" (claims 2, 4, 37, and 38).⁶

Appellants' parent and Swiss applications contain virtually identical disclosures on this point. Both disclose that the coffee extract initially produced by percolation of water through ground roasted coffee is concentrated prior to foaming by suitable means "until a concentration of 25 to 60% solid matter is reached." Examples in each disclose specific embodiments having solids contents of 36% and 50%.

In our view, it is necessary to decide only whether the Swiss application complies with the description requirement of § 112 with respect to the questioned limitations. There is no question that the *instant* application supports claims 1, 2, and 4, which are original claims in that application. Appellants and the solicitor urge us to decide this case by determining whether the broad rule of *In re Waymouth*, supra, is still valid or must be disapproved. In the interest of judicial economy, we decline this entreaty since the issue of whether the Swiss application contains written descriptions of the disputed limitations of claims 1, 2, 4, 37, and 38, being addressed to strict compliance with § 112, first paragraph, is dispositive regardless of the validity of *Waymouth* in its own factual setting. The sufficiency of the parent U.S. application need not be separately decided since appellants must have the benefit of their Swiss application date to antedate the Pfluger patent.

[2, 3] The function of the description requirement is to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed by him; how the specification accomplishes this is not material.

6. The solicitor belatedly asserts that the Swiss application is not "for the same invention" as the parent application, insofar as claims 1, 2, and 4 are concerned; he argues that the expression "same invention" in 35 U.S.C. § 119 should be given the meaning employed by us in the double patenting cases, e. g., *In re Vogel*, 422 F.2d 438, 57 CCPA 920, 164 USPQ 619 (1970). As we indicated in *In re Ziegler*, 347 F.2d 642, 52 CCPA 1473, 146 USPQ 76 (1965),

In re Smith, 481 F.2d 910, 178 USPQ 620 (Cust. & Pat.App.1973), and cases cited therein. It is not necessary that the application describe the claim limitations exactly, *In re Lukach*, supra, but only so clearly that persons of ordinary skill in the art will recognize from the disclosure that appellants invented processes including those limitations. *In re Smythe*, 480 F.2d 1376, 1382, 178 USPQ 279, 284 (Cust. & Pat.App. 1973).

[4] The primary consideration is *factual* and depends on the nature of the invention and the amount of knowledge imparted to those skilled in the art by the disclosure. The factual nature of the inquiry was emphasized in *In re Ruschig*, 379 F.2d 990, 995-96, 54 CCPA 1551, 1558-59, 154 USPQ 118, 123 (1967), which involved the question whether a broad generic disclosure "described" the single chemical compound claimed:

But looking at the problem, as we must, from the standpoint of one with no foreknowledge of the specific compound, it is our considered opinion that the board was correct in saying:

Not having been specifically named or mentioned in any manner, one is left to selection from the myriads of possibilities encompassed by the broad disclosure, with no guide indicating or directing that this particular selection should be made rather than any of the many others which could also be made.

Appellants refer to 35 U.S.C. § 112 as the presumed basis for this rejection and emphasize language therein about *enabling* one skilled in the art to *make* the invention, arguing therefrom that one skilled in the art would be enabled by the specification to make chlorpropamide. We find the argument unpersuasive for two reasons. First, it presumes some mo-

the solicitor's reading is too narrow. All § 119 requires is that the foreign application describe and seek protection for "broadly the same invention" as described in the U.S. application claiming its benefit. 347 F.2d at 649, 52 CCPA at 1481, 146 USPQ at 82. The Swiss application has essentially the same disclosure as appellants' parent application and claims broadly the same invention.

ading is too narrow. All § 119 the foreign application describe tion for, "broadly the same in- scribed in the U.S. application left.. 347 F.2d at 649, 52 CCPA SPQ at 82. The Swiss applica- ially the same disclosure as ap- plication and claims broadly ition.

Broadly articulated rules are particularly inappropriate in this area. See, e. g., *In re Smith*, 458 F.2d 1389, 1394, 59 CCPA 1025, 1033, 173 USPQ 679, 683 (1972), in which this court felt obliged to overrule a supposed "rule" of *In re Risse*, 378 F.2d 948, 952-53, 54 CCPA 1495, 1500-01, 154 USPQ 1, 5 (1967). Mere comparison of ranges is not enough, nor are mechanical rules a substitute for an analysis of each case on its facts to determine whether an application conveys to those skilled in the art the information that the applicant invented the subject matter of the claims. In other words, we must decide whether the invention appellants seek to protect by their claims is part of the invention that appellants have described as *theirs* in the specification. That what appellants claim as patentable to them is *less* than what they describe as their invention is not conclusive if their specification also reasonably describes that which they do claim. Inventions are constantly made which turn out not to be patentable, and applicants frequently discover during the course of prosecution that only a

[5] Claims 1 and 4 present little difficulty. Claim 1 recites a solids content range of "at least 35%," which reads literally on embodiments employing solids contents outside the 25-60% range described in the Swiss application. As in cases involving the enablement requirement of § 112, e. g., *In re Armbruster*, 512 F.2d 676, 185 USPQ 152 (Cust. & Pat.App.1975), we are of the opinion that the PTO has the initial burden of presenting evidence or reasons why persons skilled in the art would not recognize in the disclosure a description of the invention defined by the claims. By pointing to the fact that claim 1 reads on embodiments outside the scope of the description, the

PTO has satisfied its burden. Appellants thus have the burden of showing that the upper limit of solids content described, i. e., 60%, is inherent in "at least 35%," as that limitation appears in claim 1. Appellants have adduced no evidence to carry this burden as to claim 1, and they argue only that since the Pfluger patent contains claim 1 supported by Pfluger's disclosure with a stated upper limit of 60%, like appellants' Swiss disclosure, refusal to grant appellants claim 1 amounts to an illegal reexamination of claim 1 in Pfluger. However, as we have often repeated, as recently as *In re Giolito*, 530 F.2d 397, 188 USPQ 645 (Cust. & Pat. App.1976), it is immaterial in ex parte prosecution whether the same or similar claims have been allowed to others.

[6] Claim 4 contains the additional limitations, relating to the "final product temperature" and the pressure at which the frozen foam is vacuum freeze-dried, of "less than 110°F." and "less than 500 microns." "Final product temperature," it appears, refers to the temperature at which so-called bound water is driven off from the product by heating after the vacuum drying phase has ended. We find no description of final product temperature in appellants' Swiss application. It is not disputed that appellants do not expressly disclose final product temperatures or this secondary drying step. They again appeal, however, to the Pfluger patent disclosure and to an amendment entered in the application on appeal (not objected to as new matter by the examiner) to show that final product temperatures are conventional in the art and need not be expressly disclosed. The amendment is clearly irrelevant since claim 4, an originally filed claim, is its own written description in the appealed application. *In re Gardner*, 475 F.2d 1389, 177 USPQ 396, rehearing denied, 480 F.2d 879, 178 USPQ 149 (Cust. & Pat.App.1973). The issue is whether the Swiss application describes the claimed final product temperature, not whether the instant application does so. The Pfluger

patent disclosure is also unavailable to appellants. The Swiss application was filed before Pfluger issued, which means that for the purposes of § 112 the Pfluger disclosure is not evidence of what those skilled in the art considered conventional at the time the Swiss application was filed. *In re Glass*, 492 F.2d 1228, 181 USPQ 31 (Cust. & Pat. App.1974).⁷

[7] Claims 1 and 4, therefore, are not entitled to the benefit of the filing date of appellants' Swiss application.

[8] Claims 2, 37, and 38, which claim a solids content range of "between 35% and 60%," present a different question. They clearly claim a range within the described broad range of 25% to 60%, solids; the question is whether, on the facts, the PTO has presented sufficient reason to doubt that the broader described range also describes the somewhat narrower claimed range. We note that there is no evidence, and the PTO does not contend otherwise, that there is in fact any distinction, in terms of the operability of appellants' process or of the achieving of any desired result, between the claimed lower limit of solids content and that disclosed in the Swiss application. We see an important practical distinction between broad generic chemical compound inventions, for example, as in *In re Ruschig*, supra, in which each compound within the genus is a separate embodiment of the invention, and inventions like that at bar, in which the range of solids content is but one of several process parameters. What those skilled in the art would expect from using 34% solids content in the concentrated extract prior to foaming instead of 35% is a different matter from what those skilled in the art would expect from the next adjacent homolog of a compound whose properties are disclosed in the specification. We wish to make it clear that we are not creating a rule applicable to all description requirement cases involving

of a patent claim. See *Brailsford v. Lavet*, 318 F.2d 942, 50 CCPA 1367, 138 USPQ 28 (1963); 37 CFR 1.205(a).

7. That the final product temperature limitation is not material, as appellants argue, does not matter when the limitation is copied. Immaturity excuses only failure to copy a limitation

ranges. Where the broad de different inve subsumed) cl range does no *In re Baird*, 146 USPQ 572, 35 F.2d 572, 35 (1945).

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[9] W 2, 37, and the filing tion.

Since t as prior §§ 102(e) 38, the re The rejec Appellan 204(c) sl claims 1 date, *In* CCPA 7: not ant under 3:

ranges. Where it is clear, for instance, that the broad described range pertains to a different invention than the narrower (and subsumed) claimed range, then the broader range does not describe the narrower range. *In re Baird*, 348 F.2d 974, 52 CCPA 1747, 146 USPQ 579 (1965); *In re Draeger*, 150 F.2d 572, 32 CCPA 1217, 66 USPQ 247 (1945).

In the context of *this* invention, in light of the description of the invention as employing solids contents within the range of 25-60% along with specific embodiments of 36% and 50%, we are of the opinion that, as a factual matter, persons skilled in the art would consider processes employing a 35-60% solids content range to be part of appellants' invention and would be led by the Swiss disclosure so to conclude. Cf. *In re Ruschig*, supra. The PTO has done nothing more than to argue lack of literal support, which is not enough. If lack of literal support alone were enough to support a rejection under § 112, then the statement of *In re Lukach*, supra, 442 F.2d at 969, 58 CCPA at 1235, 169 USPQ at 796, that "the invention claimed does not have to be described *in ipso verbiis* in order to satisfy the description requirement of § 112," is empty verbiage. The burden of showing that the claimed invention is not described in the specification rests on the PTO in the first instance, and it is up to the PTO to give reasons why a description not *in ipso verbiis* is insufficient.

[9] We conclude, therefore, that claims 2, 37, and 38 are entitled to the benefit of the filing date of appellants' Swiss application.

Since the Pfluger patent is not available as prior art as of its 1966 date under §§ 102(e) and 103 against claims 2, 37, and 38, the rejection of those claims is reversed. The rejection of claims 1 and 4 is affirmed. Appellants filed no affidavit under Rule 204(c) showing a date of invention for claims 1 and 4 prior to Pfluger's 1966 filing date, *In re Gemassmer*, 319 F.2d 539, 51 CCPA 726, 138 USPQ 229 (1963), and have not antedated Pfluger as to those claims under 35 U.S.C. §§ 119 and 120.

The New Matter Rejection

[10] The issue to be decided here is whether the limitation appearing in claim 6, carried forward into the other claims affected by this rejection, that the frozen foam be ground "to a particle size of at least 0.25 mm" before it is dried, was added to the instant application in violation of 35 U.S.C. § 132. This new matter rejection rests on a finding by the PTO that the application as filed did not describe this limitation. Thus, the converse of what we said in *In re Bowen*, 492 F.2d 859, 864, 181 USPQ 48, 52 (Cust. & Pat.App.1974), is true in this case, namely, that this new matter rejection is tantamount to a rejection of the claims on the description requirement of 35 U.S.C. § 112, first paragraph. The solicitor agrees with this.

We conclude that the originally filed specification clearly conveys to those of ordinary skill in the art that appellants invented processes in which the frozen foam is ground to a particle size of "at least .025 mm," and not, as the PTO asserts, only processes in which the particle sizes are no larger than 2 mm. See *In re Smythe*, supra.

The specification states, *inter alia* (emphasis ours):

At the end of the [cooling] belt the extract is removed as a continuous rigid sheet which may then be broken up into fragments suitable for grinding. These fragments may, for example, be ground to a particle size which is preferably within the range 0.25 to 2.0 mm.

* * * * *

In a modification of the process, the frozen extract may be freeze-dried in the form of plates or lumps which are subsequently ground to the desired particle size.

The examples speak of drying frozen ground particles of sizes between 0.1 and 2 mm. While the specification indicates that the 0.25 to 2.0 mm range is preferred, we think it clearly indicates that, as an alternative embodiment of appellants' invention,

so unavailable to application was filed which means that for the Pfluger disclosure at those skilled in the art at the time the application was filed. *In re Glass*, 31 USPQ 31 (Cust. & Pat.

4, therefore, are not entitled to the benefit of the filing date of the application.

and 38, which claim a range of "between 35% and 60% solids content," present a different question. They claim "within the described range, to 60%, solids; the PTO, on the facts, the PTO has no sufficient reason to doubt the described range also described at narrower claimed range, there is no evidence, and not contend otherwise, to distinguish, in light of appellants' process of any desired result, and lower limit of solids content disclosed in the Swiss application as an important practical broad generic chemical process, for example, as in *In re Glass*, in which each compound is claimed as a separate embodiment of inventions like that at issue of solids content is a process parameter. In the art would expect solids content in the prior art to foaming instead of the present matter from what the art would expect from the homolog of a compound disclosed in the specification to make it clear that we have a rule applicable to all cases involving

See *Brailsford v. Lavet*, 318 F.2d 1367, 138 USPQ 28 (1963);

the foam may be dried in lumps or plates of undisclosed size, which are reduced to the obviously smaller preferred particle size by grinding only *after* being dried. The solicitor argues that the claimed "range" has no upper limit, wherefore it is not disclosed. The clear implication of this disclosed modification is that appellants' specification does describe as their invention processes in which particle size is "at least 0.25 mm," without upper limit, as delineated by the rejected claims. The rejection of claims 6-10, 12-15, 17, and 26 under 35 U.S.C. § 132 is reversed.

*The "Non-Interference" Claims—6-35
and 40-43*

In the Examiner's Answer, appellants were granted the benefit of the filing date of their Swiss application for claims 16-25, 27-35, and 40-43. The examiner stated: "Claims 6-15 and 26, except for new matter, would otherwise be supported in the Swiss application." Our reversal of the new matter rejection eliminates the basis for the examiner's refusal to give claims 6-15 and 26 the benefit of appellants' Swiss filing date. Appellants' parent and Swiss applications contain the same disclosures concerning particle size as does the application on appeal, and we shall treat all the claims under this heading as entitled to the right of foreign priority claimed by appellants.

Our analysis of these claims will be broken down by the type of claim involved, i. e., process, apparatus, and product, and not as the board addressed them. In each discussion we will apply as prior art under § 102(e) only those portions of the Pfluger patent disclosure that were carried forward from the Pfluger 1963 application (Pfluger 1963) through the two subsequent applications into the patent, as did the board. *In re Lund*, supra.

A. Process Claims 6-14 and 16-29

There are four independent process claims: claim 6, from which claims 7-14, 16, and 17 depend; claim 18; claim 19, from which claim 20 depends; and claim 21, from which claims 22-29 depend.

Pfluger 1963 contains the following disclosure, which, in substance, is carried forward into the patent:

This invention is founded on the discovery that an aqueous aromatic liquid containing solids in suspension and solution may be dried without undergoing loss of aromatic volatiles by a process which comprises foaming the aqueous liquid to a substantial overrun while avoiding evaporation of said aqueous liquid, freezing said foam to below its eutectic point while avoiding evaporation of the aqueous liquid, subliming said aqueous liquid from the frozen foam to reduce the moisture of the foam to at least 10-20%, and further drying the foam to a stable moisture content.

In many applications such foaming can be considerably increased by concentrating the solution or suspension to a relatively high solids content prior to incorporation of air or other gas such as nitrogen therein by first whipping and then freezing the foam, preferably by conductive freezing. During the foaming step, it is essential in order to prevent loss of volatiles to avoid any evaporative cooling of the material, i. e., evaporation of water during the foaming step. Also, during the freezing step evaporative cooling should be avoided. Other ways for creating a frozen foam without undergoing evaporative cooling involve the overt introduction to a solution or suspension of dry ice, i. e., solid carbon dioxide in a suitably ground or particulate form, whereby carbon dioxide gas is liberated upon subliming of the "dry ice" to cause foaming of the solution or suspension to occur. Similarly, refrigerated air or nitrogen can be introduced to the solution or suspension to cause freezing thereof incident to foaming the material. The foam preferably has a high overrun whereby the density of the solution or suspension is changed from above 1.0 gm./cc. to between 0.1-0.5 gms/cc.

Example I, the sole disclosed embodiment in which the foam density is given, shows

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ains the following dis-
stance, is carried for-
it:

is founded on the dis-
queous aromatic liquid
in suspension and solu-
ed without undergoing
volatiles by a process
oaming the aqueous liq-
ial overrun while avoid-
of said aqueous liquid,
m to below its eutectic
ling evaporation of the
subliming said aqueous
rozen foam to reduce the
oam to at least 10-20%,
ng the foam to a stable

ations such foaming can
increased by concentrat-
or suspension to a rela-
content prior to incorpo-
ther gas such as nitrogen
whipping and then freez-
preferably by conductive
g the foaming step, it is
r to prevent loss of vola-
y evaporative cooling of
e., evaporation of water
ning step. Also, during
tep evaporative cooling
d. Other ways for creat-
oam without undergoing
ling involve the overt in-
solution or suspension of
olid carbon dioxide in a
d or particulate form,
dioxide gas is liberated
of the "dry ice" to cause
solution or suspension to
ly, refrigerated air or ni-
introduced to the solution
to cause freezing thereof
ming the material. The
ly has a high overrun
density of the solution or
changed from above 1.0
ween 0.1-0.5 gms/cc.

le disclosed embodiment in
density is given, shows

foaming the extract to a density of 0.22
gm/cc.

Claims 19 and 20 recite a foam density of
"between about 0.6 and about 0.8 gm/cc,"
outside the range disclosed by Pfluger 1963.
The examiner's position was that Pfluger's
disclosure of 0.5 gm/cc as an upper density
limit suggests "about 0.6 gm/cc" as the
lower limit in the processes of claims 19 and
20 "in the absence of a critical difference
between them." We see no such sugges-
tion. By preferring a high foam overrun, i.
e., lower rather than higher foam densities,
Pfluger 1963 teaches away from employing
higher foam densities than its disclosed up-
per limit of 0.5 gm/cc. Appellants' "about
0.6 gm/cc" lower limit is sufficiently precise
to describe foam densities above 0.5 gm/cc
and thus outside the range of foam densi-
ties that persons of ordinary skill in the art
would have been motivated to use by Pfluger
1963's disclosure of a preference for
high overrun foams no denser than 0.5
gm/cc. The examiner's comment about the
lack of a showing of a critical difference is
based on his failure to appreciate that Pfluger
1963 teaches away from increasing
foam density. The rejection of claims 19
and 20 under § 103 is reversed.

[11, 12] Claims 6-14, 16, 17, and 21-29
recite foam density ranges of "between
about 0.4 and 0.8 gm/cc" and solids con-
tents in the range of "about 25% to 60%."
Claims 6-10, 12-14, 17, and 26 recite parti-
cle sizes of "at least 0.25 mm," claims 16
and 27 say "about 0.25 to 2 mm," claims 11
and 28 recite particle sizes "approximately
equal to that of roast and ground coffee,"
and claims 21-25 do not mention particle
size. Pfluger 1963's disclosed foam density
range of 0.1-0.5 gm/cc covers values within
the scope of all the above-listed claims; the
solids contents disclosed in Pfluger 1963
Examples I (27%) and V (30%), are within
the claimed ranges of 25-60%. Pfluger
1963 clearly teaches a process for making
instant coffee comprising the steps of pre-
paring and concentrating aqueous coffee
extract, foaming the extract then freezing
the foam, and drying the frozen foam, in
that order. Pfluger 1963 teaches fragment-

ing the frozen foam into 3/4-inch pieces be-
fore drying; 3/4 inch is, of course, "at least
0.25 mm." Of course, the disclosure in the
prior art of any value within a claimed
range is an anticipation of the claimed
range. We appreciate the arguments made
in *In re Malagari*, 499 F.2d 1297, 182 USPQ
549 (Cust. & Pat.App.1974), and the discus-
sion in *re Orfeo*, 440 F.2d 439, 58 CCPA
1123, 169 USPQ 487 (1971), to the effect
that ranges which overlap or lie inside
ranges disclosed by the prior art may be
patentable if the applicant can show criti-
cality in the claimed range by evidence of
unexpected results. The rejections here are
under § 103, not § 102, which requires us to
consider appellants' argument that their in-
vention and Pfluger's disclosure are direct-
ed to different purposes and that persons of
ordinary skill in the art would not look to
Pfluger 1963 for a solution to the problem
addressed by appellants. See *In re Orfeo*,
supra.

Appellants' contentions were thus stated
in their main brief:

The Board erred at the threshold in
failing to appreciate that neither the
Pfluger patent nor the 1963 Pfluger ap-
plication gives any inkling or hint of the
inventive concept underlying the rejected
claims. * * * The Pfluger disclosures
make no mention of product bulk density
and contain no suggestion of altering or
regulating that density in any manner.
Neither does the reference suggest appel-
lants' step of grinding the foam before
freeze drying.

One of ordinary skill in the art reading
the 1963 Pfluger disclosure would have
no inkling of the problem addressed and
solved by appellants; and one looking for
ways to meet that problem would have no
occasion to consider Pfluger or his expe-
dients.

Without an antecedent basis for it in their
application, appellants may not use this ra-
tionale to show unobviousness. *In re Dav-
ies*, 475 F.2d 667, 177 USPQ 381 (Cust. &
Pat.App.1973). While appellants do disclose
what the bulk density of their product

"usually" is, we find no suggestion in appellants' application that their invention is addressed to the regulation of the bulk density of the product, and the claims make no express reference to such regulation. The only references in appellants' disclosure to this alleged problem and its solution which are apparent to us are (emphasis ours):

After freeze-drying, the coffee extract is obtained in the form of a powder the density of which is *usually* 0.2 to 0.3 gm/cc.

* * * * *

Drying of the concentrated extract should *desirably* be carried out *under controlled conditions* such that the finished product possesses an appropriate *density* and *colour*. * * *

* * * The conditions of freezing, notably belt speed, freezing temperature, thickness of foam layer as well as the *density of the foam*, are factors which have an important *influence on the colour* of the finished product and should therefore be carefully controlled.

The inadequacy of this disclosure is evident. There is no mention of *regulating* the final product density or of controlling solids content. We therefore see no basis for depreciating Pfluger as evidence of the scope and content of the prior art, as well as of the level of ordinary skill in this art, as appellants would have us do. Nor is there any factual basis for concluding that the ranges claimed by appellants are critical in themselves to their alleged inventive contribution.

We find no error in the rejection under § 103 of claims 6-14, 16, and 21-28, which recite no final product density. The only difference between claims 6, 12-14, and 16 and the Pfluger 1963 disclosure upon which appellants rely to show the unobviousness of the subject matter of the claims (and which does not relate to solids content or foam density) is the step of "grinding the frozen foam to a particle size of at least 0.25 mm" *prior to freeze-drying*.⁸ Pfluger 1963, appellants assert, "fragments" the

frozen foam prior to drying and "grinds" the foam only after it has been dried. As indicated above, the size of the fragments of frozen foam disclosed by Pfluger 1963 is "at least 0.25 mm." We do not think this difference shows the subject matter to be unobvious. Pfluger 1963 implies that the sizes of foam particles before and after drying are comparable; it would have been obvious to reduce the size of the foam particles by suitable mechanical means, whether it be called fragmenting or grinding, to the desired end product size before rather than after drying. Claim 11 differs only in its recitation of final product particle size, which Pfluger 1963 shows is an obvious matter of choice for those of ordinary skill in the art, who know how large ground roasted coffee bean particles are. The commercial motivation for making the particles this size is obvious. Appellants have not argued the patentability separately from claim 6 of claims 9 and 10, which add temperature and foam thickness limitations suggested by Pfluger and De George, as discussed *infra* in considering claims 24 and 25.

Claim 8 likewise recites no final product density, but it requires that the freezing of the foam take place over a period of 7 to 25 minutes, which, appellants' application indicates, produces instant coffee "having a pleasant dark colour." Pfluger 1963 discloses freezing in liquid nitrogen or liquid air, which would be instantaneous, or rapid freezing on a belt, and states further, "The foam may be frozen at a high or a more gradual rate *without any apparent difference* in the utility thereof insofar as freeze drying is concerned * * *." (Emphasis ours.) Appellants have not shown that only their claimed freezing time produces coffee with a pleasant dark color. Thus, they have not overcome the *prima facie* case of obviousness made out by Pfluger 1963.

In light of appellants' concession in the amendment in which they added claims 37-39 that freeze concentration was known in the art, the rejection of claims 21-23, and

8. Appellants do not deny that the features added in claims 7, 12, 13, and 14 are taught in the

art, and the record shows them to be known in the prior art.

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prior to drying and "grinds" after it has been dried. As the size of the fragments disclosed by Pfluger 1963 is "nm." We do not think this is the subject matter to be claimed by Pfluger 1963 implies that the particles before and after drying are comparable; it would have been obvious to one of ordinary skill in the art to use the size of the foam particles as a mechanical means, whether by grinding or grinding, to the particle size before rather than after drying. Claim 11 differs only in its final product particle size, which is disclosed by Pfluger 1963.

Pfluger 1963 shows is an obvious process for those of ordinary skill in the art to know how large ground particles are. The combination for making the particles is obvious. Appellants have not shown patentability separately from claims 9 and 10, which add temperature and thickness limitations suggested by De George, as disclosed in claims 24 and 25.

Pfluger 1963 recites no final product density requirements that the freezing of coffee takes place over a period of 7 to 25 minutes, appellants' application indicates instant coffee "having a light brown color." Pfluger 1963 discloses in liquid nitrogen or liquid air, which would be instantaneous, or rapid freezing, and states further, "The coffee is frozen at a high or a more rapid rate without any apparent difference thereof insofar as freeze time is concerned * * *." (Emphasis added.) Appellants have not shown that only a certain freezing time produces coffee of a certain dark color. Thus, they have made the prima facie case of obviousness out by Pfluger 1963.

Appellants' concession in the prior art, which they added claims 37-40, that concentration was known in the prior art, rejection of claims 21-23, and the prior art shows them to be known in the prior art.

Claims 26-28 under Category VI, supra, become little more than a rejection on Pfluger 1963 alone. With the exception of freeze concentration, which is disclosed by the British patent, every element of claim 21 is disclosed by Pfluger 1963, as indicated supra. Appellants advance no arguments for the patentability of claim 21 different from those we have already rejected for claim 6. Claim 22 adds only a recitation of the inert gases used in the foaming step, which were known in the prior art. Claims 26-28 recite the particle sizes of claims 6, 16, and 11, respectively; these particle sizes are not sufficient to show unobviousness for the reasons given supra. Claim 23, which was also rejected under Category VI, recites the freezing time of claim 8. It is unpatentable for the same reasons given for claim 8, supra.

Claims 24 and 25, to which Pfluger 1963, De George, and the British patent were applied under § 103, call for the temperature and foam limitations already discussed under claims 9 and 10, supra. Temperature and foam thicknesses within the claimed ranges are disclosed by Pfluger 1963 in Example VI (freezing foam at -30°F. on a belt and subsequently loading foam onto trays to a 1-inch (approx. 25 mm) depth for vacuum drying). Appellants do not allege that the ranges of claims 24 and 25 are critical.

Claims 17, 18, and 29, on the other hand, recite the bulk density of the final product made by each process in positive terms. The board dismissed these final product density limitations as being merely recitations of the inherent result of observing the foam density and solids content ranges set forth in these claims. Although we found above that appellants' specification as filed does not disclose regulating product density by controlling the foam density and solids content in the process and that claims which failed to recite controlled product density could not rely on this feature to distinguish over the prior art under § 103, these claims do require such regulation or control, by implication through their ex-

press recitation of the density of the final product to be obtained from the processes they delimit. That persons skilled in the art may not know how to ensure the claimed final product densities from the specification is pertinent only to a rejection on the enablement requirement of § 112, first paragraph, which is not before us. The only question here is whether the subject matter of claims 17, 18, and 29, the scope of which is unquestionably clear, is obvious under § 103.

Pfluger 1963 discloses no final product densities and contains no teaching on how to achieve any particular final product density from practicing its process. The inherency of final product density adverted to by the board can be gleaned only from appellants' disclosure, if anywhere, which may not be used against them as prior art absent some admission that matter disclosed in the specification is in the prior art. *In re Kuehl*, 475 F.2d 658, 177 USPQ 250 (Cust. & Pat.App.1973); cf. *In re Nomiya*, 509 F.2d 566, 184 USPQ 607 (Cust. & Pat.App.1975). In the absence of disclosure of final product densities or how to achieve any desired density in the prior art applied by the PTO to claims 17, 18 and 29, we cannot say that the subject matter of these claims would have been obvious to persons of ordinary skill in the art.

The rejection of process claims 6-14, 16, and 21-28 is affirmed; the rejection of claims 17-20, and 29 is reversed.

B. Apparatus Claims 30-35

[13] The preamble of independent claim 30, carried forward into claims 31-35, recites that the apparatus is "for carrying out the process in claim 6." Appellants contend that this preamble gives "life and meaning" to the claims, serving to define the interrelationship of the mechanical elements recited in the body of the claims. This argument appears to be based on *Kropa v. Robie*, 187 F.2d 150, 38 CCPA 858, 88 USPQ 478 (1951), the classic case in this court on the construction of claim preambles. In *Kropa* the court surveyed prior cases and

said, 187 F.2d at 152, 38 CCPA at 861, 88 USPQ at 480-81.

[I]t appears that the preamble has been denied the effect of a limitation where the claim or count was drawn to a structure and the portion of the claim following the preamble was a self-contained description of the structure not depending for completeness upon the introductory clause * * *. In those cases, the claim or count apart from the introductory clause completely defined the subject matter, and the preamble merely stated a purpose or intended use of that subject matter.

While we do not subscribe to the broad proposition that process limitations can never serve to distinguish the subject matter of apparatus claims from the prior art, we fail to see how the general process parameters of claim 6 require an arrangement of the apparatus means recited in claims 30-35 more specific than that set forth in the body of each claim. In no claim is the preamble relied on to provide an antecedent basis for terms in the body. See *In re Higbee*, 527 F.2d 1405, 188 USPQ 488 (Cust. & Pat.App.1976). The context of each invention is clear without reference to claim 6, unlike the situation in *Kropa*, supra, in which the preamble "An abrasive article" was the only portion of the claim defining the relationship of the components recited in the body of the claim; the court said, "The term calls forth a distinct relationship between the proportions of grain and resin comprising the article." 187 F.2d at 152, 38 CCPA at 862, 88 USPQ at 481.

Appellants do not argue the patentability of claims 32-35 separately from claim 30 and concede that Carpenter discloses the feature added in claim 31. We find that the teachings of Pfluger and De George (and Carpenter on claim 31) show that the subject matter of claims 30-35 would have been obvious to persons of ordinary skill in the art. These references are to be viewed for what they disclose in their entireties and not merely for their inventive contributions to the art. *In re Ogiue*, 517 F.2d 1382, 1387, 186 USPQ 227, 232 (Cust. & Pat.App. 1975).

Pfluger 1963, in a portion carried forward to the patent, discloses the following:

Advantageously, in following the teachings of the present process either in a vacuum freeze drying application or in an atmospheric freeze drying application, the frozen foamy mass may be arranged for either batch or continuous processing in any one of a variety of conventional plant handling applications. Thus, the foamy mass can be readily transferred from one food handling station to another, deposited in trays or continuous belts, superposed on one another or otherwise conventionally located in the vicinity of the freeze drying influences. In the case of a typical freeze drying operation the foams may be frozen and deposited onto trays stacked one above the other on a suitable heat transfer surface in a vacuum chamber. In the case of an atmospheric freeze drying application the foams can be stacked one upon the other upon a foraminous drying member permitting the circulation of the drying medium, e. g. dry air, helium or nitrogen. Throughout all of such freeze drying applications it is imperative that the temperature of the foamy mass be maintained below the eutectic point of the material while drying to assure that the foam stays in a substantially solid or frozen state as distinguished from a melted or semi-liquid state, dehydration of the mass being achieved by a process of sublimation as distinguished from one of evaporation. Such conditions should be followed at least until the moisture content of the foamy mass has been substantially reduced to a point where it has lost at least a majority of its moisture and preferably is superficially dry to the touch, i. e. in the neighborhood of 10-20% moisture by weight.

Example VI of Pfluger 1963, which is carried forward as Example III of the Pfluger patent, shows heat controlling the vacuum chamber to assure a product temperature below -10°F. (De George teaches that the melting point of a 28% solids content extract is about 27°F., whereas the eutectic temperature is constant regardless of con-

a portion carried forward closes the following:

sly, in following the present process either in the drying application or in freeze drying application, any mass may be arranged in or continuous processing a variety of conventional applications. Thus, the can be readily transferred handling station to another trays or continuous belts, one another or otherwise located in the vicinity of drying influences. In the case of freeze drying operation the frozen and deposited onto one above the other on a transfer surface in a vacuum.

In the case of an atmospheric drying application the tacked one upon the other in a continuous drying member percolation of the drying medium air, helium or nitrogen.

of such freeze drying application imperative that the temperature of the foamy mass be maintained at the eutectic point of the material to assure that the foam is substantially solid or frozen and is not liquified from a melted or melted, dehydration of the mass by a process of sublimation. The mass should be followed until the moisture content of the mass has been substantially reduced to a point where it has lost a majority of its moisture and preferentially dry to the touch, in the neighborhood of 10-20% moisture.

Pfluger 1963, which is as Example III of the Pfluger's heat controlling the vacuum to assure a product temperature. (De George teaches that it of a 28% solids content at 27°F., whereas the eutectic is constant regardless of con-

centration at about -13.5°F.) De George discloses the use of endless belts, low speeds, and refrigerating means, and appellants, while arguing that De George treats the handling of solid slabs of frozen extract on refrigeration belts and not frozen foamed extracts, do not and cannot deny that De George discloses apparatus that persons of ordinary skill in the art would have deemed suitable for handling foams in the manner shown by Pfluger. Appellants also contend that neither reference discloses the "spreading device" recited in the claims, Pfluger 1963 showing only the application of 1/4" diameter ribbons of foam through a nozzle to stationary freeze drying trays. The reference in the portion of Pfluger 1963 quoted supra to the deposition of the foam on the belts is ample suggestion, in our opinion, that some means must be employed to apply the foamy mass to the continuous belts. The term "spreading device" is not defined in any special way by appellants and is broad enough to be the means for applying the foam to the belt suggested by Pfluger. The rejection of claims 30-35 is affirmed.

C. Product Claims 15 and 40-43

[14] These claims are cast in product-by-process form. Although appellants argue, successfully we have found, that the Pfluger 1963 disclosure does not suggest the control of bulk density afforded by appellants' process, the patentability of the products defined by the claims, rather than the processes for making them, is what we must gauge in light of the prior art. See *In re Bridgeford*, 357 F.2d 679, 53 CCPA 1182, 149 USPQ 55 (1966). Each of these claims defines a freeze-dried instant coffee product made by processes which, appellants have contended with respect to their process claims, produce, by virtue of the foam density and solids content ranges taught by

9. Appellants argue in their reply brief that claims 40-43 "were never the subject of an accurate or proper rejection," because the examiner and the board incorrectly grouped them with other claims. As we have indicated, the rejection of claims 40-43 on Pfluger under § 103 was "proper"; appellants do not contend that they could not understand the basis for the

appellants, products having a bulk density comparable to spray-dried instant coffee, i.e., 0.2-0.3 gm/cc as indicated in appellants' specification. The solids content and foam density ranges disclosed by Pfluger 1963 overlap those of appellants, and, it appears, the Pfluger process using solids contents and foam densities overlapping those of appellants will produce instant coffee which is indistinguishable from appellants' products. There is no evidence showing that Pfluger's product prepared, for example, using an extract of 30% solids content foamed to a density of 0.5 gm/cc differs from appellants' claimed products in any way, certainly not in any unobvious way. See *In re Avery*, 518 F.2d 1228, 1233-34, 186 USPQ 161, 165-66 (Cust. & Pat.App.1975). That some of the products covered by appellants' claims may not be disclosed or suggested by Pfluger 1963 is not relevant to patentability, since the claims embrace other subject matter completely disclosed by Pfluger 1963, complete disclosure in the prior art being the epitome of obviousness. *In re Pearson*, 494 F.2d 1399, 181 USPQ 641 (Cust. & Pat.App.1974). The rejection of these product claims under § 103 on Pfluger⁹ is affirmed.

Conclusion

The appeal is dismissed as to withdrawn claims 3, 5, 36, and 39. The decision of the board is affirmed as to claims 1, 4, 6-16, 21-28, 30-35 and 40-43, and is reversed as to claims 2, 17-20, 29, 37, and 38.

MODIFIED

APPENDIX

2. The process of claim 1 wherein the extract is concentrated to between 35% and 60% soluble solids prior to the foaming step.

rejection because of failure of the PTO to give clear reasons for its action under 35 U.S.C. § 132, and we find the explanations given by the examiner and board with respect to claims 40-43 to have been legally ample under § 132. Cf. *In re Gustafson*, 331 F.2d 905, 51 CCPA 1358, 141 USPQ 585 (1964).

APPENDIX—Continued

3. The process of claim 2 wherein the concentrated extract is foamed to an overrun density of between 0.1 to 0.7 gm/cc.

4. The process of claim 2 wherein the frozen foam is vacuum freeze-dried at a pressure of less than 500 microns and a final product temperature of less than 110°F.

5. The process of claim 3 wherein the frozen foam is vacuum freeze-dried at a pressure of less than 500 microns and a final product temperature of less than 110°C.

7. A process according to claim 6 in which said inert gas is at least one of the following gases, namely carbon dioxide, nitrous oxide and nitrogen.

8. A process according to claim 6 in which the foam is frozen during 7 to 25 minutes.

9. A process according to claim 6 in which the foam is frozen on a moving belt which is cooled to a temperature between -12 and -70°C.

10. A process according to claim 6 wherein the foam is spread on the belt at a layer thickness of 10 to 40 mm.

11. A process according to claim 6 in which the frozen foam is ground, before freeze-drying, to a particle size approximately equal to that of roast and ground coffee.

12. A process according to claim 6 in which an aromatic condensate obtained by stripping roast and ground coffee is added to said concentrated extract before it is transformed into a foam.

13. A process according to claim 6 in which, after freeze-drying, the powdered coffee extract is aromatised by incorporation therein of 0.1 to 0.5% by weight of an aromatic condensate obtained by stripping of roast and ground coffee.

14. A process according to claim 13 in which said condensate is incorporated in said powdered extract in admixture with an oily carrier.

15. The coffee extract obtained by the process defined in claim 6.

16. Process according to claim 6 in which the frozen foam is ground to a particle size of about 0.25 to 2.0 mm.

17. Process according to claim 6 in which the freeze dried extract has a density of about 0.2 to 0.3 gm/cc.

18. Process for preparing a soluble coffee extract, which comprises adding inert gas to a concentrated aqueous extract of roast coffee having a solids content of about 25% to about 60% to provide a foam, freezing the foam to a solid mass, reducing the frozen foam to particles having a size of about 0.25 to 2.0 mm and freeze drying the frozen particles, the amount of inert gas added to the aqueous extract being sufficient to provide a freeze dried extract having a density between about 0.2 and 0.3 gm/cc.

19. Process for preparing a powdered coffee extract which comprises adding sufficient inert gas to a concentrated aqueous extract of roast coffee to provide a foam having a density between about 0.6 and about 0.8 gm/cc, freezing the foamed extract to a solid mass, grinding the frozen foam to an average particle size of 0.1 to 0.5 mm, freeze drying the ground particles to provide a finely powdered coffee extract, and agglomerating the finely powdered coffee extract.

20. Process according to claim 19, in which the powdered extract is agglomerated to provide an agglomerate having a density of about 0.2 to 0.3 gm/cc.

21. Process for preparing a powdered coffee extract which comprises increasing the soluble coffee solids content of an aqueous extract of roast ground coffee to about 25%-60% by freeze concentration, separating the concentrated extract from ice crystals, adding an inert gas to the concentrated aqueous extract to provide a foam having a density between about 0.4 and 0.8 gm/cc, freezing the foam to a solid mass and freeze drying the frozen foam.

22. Process according to claim 21 in which the inert gas is selected from the group consisting of carbon dioxide, nitrous oxide and nitrogen.

APPENDIX—Continued

23. Process according to claim 21 in which the foam is frozen during 7 to 25 minutes.

24. Process according to claim 21 in which the foam is frozen on a moving belt which is cooled to a temperature between -12 and -70°C .

25. Process according to claim 24 wherein the foam is spread on the belt at a layer thickness of 10 to 40 mm.

26. Process according to claim 21 in which the frozen foam is ground before freeze drying to a particle size of at least 0.25 mm.

27. Process according to claim 26 in which the frozen foam is ground to a particle size of about 0.25 to 2mm.

28. Process according to claim 21 in which the frozen foam is ground before freeze drying to a particle size approximately equal to that of roast and ground coffee.

29. Process according to claim 21 in which the freeze dried extract has a density of about 0.2–0.3 gm/cc.

31. An apparatus according to claim 30 in which the means for cooling the belt includes a plurality of sprinklers disposed to spray the refrigerant onto the underside of the belt.

32. An apparatus according to claim 30 in which the belt comprises two sections each provided with separate cooling means, the first of said sections being cooled to a temperature of -12 to -29°C and the second section to -40 to -70°C .

33. An apparatus according to claim 30 also comprising means for fragmenting and milling the frozen foam.

34. An apparatus according to claim 30 in which the length of said belt is 15 to 25 metres and the driving means is adapted to move said belt at a linear speed of about 0.5 to 1.5 m/min.

35. An apparatus according to claim 30 in which said chamber is adapted to be maintained at a temperature of -25 to -45°C .

36. The process of claim 2 wherein the concentrated extract is foamed to an overrun density of between about 0.1 to 0.8 gm/cc.

37. The process of claim 2 wherein the concentrated [506] extract is foamed to an overrun density of between 0.4 to 0.8 gm/cc.

38. The process of claim 2 wherein the frozen foam is vacuum freeze-dried at a pressure of about 150 to 175 microns.

39. The process of claim 3 wherein the frozen foam is vacuum freeze-dried at a pressure of about 150 to 175 microns.

41. A coffee powder according to claim 40 wherein the extract before freeze drying contains about 25% to 60% by weight of soluble coffee solids.

42. A dry coffee powder having a density of about 0.2 to 0.3 gm/cc and comprising a freeze dried particulated foamed extract of roast and ground coffee, said extract containing before freeze drying up to about 60% by weight of soluble coffee solids.

43. A coffee powder according to claim 42 containing about 0.1% to 0.5% by weight of aromatic condensate obtained by stripping roast and ground coffee.

BALDWIN, Judge (concurring in part and dissenting in part).

I agree with Judge Miller's treatment of claims 17–20 and 29. Otherwise, I join the majority opinion.

MILLER, Judge (dissenting in part and concurring in part).

I dissent on claim 1. The error of the majority in affirming the rejection stems from a misstatement of the issue. It is not necessary when antedating a reference under 35 U.S.C. § 102(a) or (e) to establish a prior reduction to practice, constructive or actual, of all the subject matter falling within the claims. It is necessary only to establish a reduction to practice of sufficient subject matter to render the claimed invention obvious to one of ordinary skill in the art. *In re Spiller*, 500 F.2d 1170, 182 USPQ 614 (Cust. & Pat.App.1974). The

majority errs, therefore, in seeking a description in appellants' parent and foreign priority applications to support the entire claimed subject matter as though these were the applications in which the claims appear. See *In re Ziegler*, 347 F.2d 642, 52 CCPA 1473, 146 USPQ 76 (1965). Appellants have clearly shown possession of enough of the invention to antedate Pfluger 1966 by establishing a prior constructive reduction to practice in their parent and foreign applications of specific embodiments disclosing concentrating to 50% and 36% total solids and by a broader disclosure of "25 to 60%."

Although the rejection of claim 1 arises in the context of an attempt to initiate an interference, the rejection is clearly under 35 U.S.C. § 102(a) or (e) and not under Rule 204(c), 37 CFR 1.204(c). Even if the rejection were under that rule, the substance of the rule's requirement for evidence sufficient to establish a prima facie case for a judgment of priority against Pfluger 1966 would be satisfied by the prior constructive reduction to practice of embodiments within claim 1 in appellants' parent and foreign applications. *Hunt v. Treppschuh*, 523 F.2d 1386, 187 USPQ 426 (Cust. & Pat.App.1975); *Fontijn v. Okamoto*, 518 F.2d 610, 186 USPQ 97 (Cust. & Pat.App.1975).

The majority cites *In re Gemassmer*, 319 F.2d 539, 51 CCPA 726, 138 USPQ 229 (1963), to support its decision on claim 1. It suffices to note that *Gemassmer* was decided more than a decade before *In re Spiller*, *Hunt v. Treppschuh*, and *Fontijn v. Okamoto*, *supra*.

I concur in the decision on claim 4 since appellants' parent and foreign applications are silent regarding final product temperature and a secondary heating step and, therefore, fail even as a constructive reduction to practice of the invention of claim 4.

I concur also in the decision on claims 19 and 20, but I do not find it necessary to hold, as the majority implicitly does, that "about 0.6" gm/cc excludes 0.5 gm/cc disclosed in the reference as the upper limit of merely a preferred range. Moreover, it is obvious from the reference that the process would work at a higher density than 0.5, although inferior results might be expected. My concurrence rests on the requirement of claims 19 and 20 of a specific sequence of steps not suggested by the prior art, namely: providing a high density of about 0.6 to about 0.8 gm/cc, grinding to a fine particle size prior to freeze drying, freeze drying, and finally agglomerating the fine particles into larger particles. This achieves a "highly coloured product of regular particle size." There is no suggestion in the prior art of deliberately grinding to a fine size and then agglomerating to a larger size.

I dissent on claims 17, 18, and 29, because there is at least a prima facie relationship between product and foam densities. The board noted this by stating that "the freeze dried density of the coffee would be inherent in view of the same range of foam overrun density disclosed by Pfluger." Since the foam densities and other conditions disclosed by Pfluger for the process claimed are approximately the same, appellants should be required either to show that the reference does not achieve the same product densities or to establish criticality. Since they have not done so, I would affirm the rejection of claims 17, 18, and 29.



which obligate the Government to an expenditure of funds....

Similarly, 41 C.F.R. § 1.209 (1983) defines "procurement" as

the acquisition ... from non-Federal sources, of personal property and non-personal services (including construction) by such means as purchasing, renting, leasing (including real property), contracting or bartering, but not by seizure, condemnation, donation, or requisition.

Here there was no "buyer" or "seller" and no obligation on the part of the Government to expend funds. The Claims Court noted that "a cash 'payment' is not the applicable test" of whether a contract comes within the ambit of the CDA. See *Coffey v. United States On Behalf Of The Commodity Credit Corp.*, 626 F.Supp. 1246, 1250 (D.Kan.1986). We are persuaded, however, that the transaction here was closer to being donative in nature than it was to the contracts for procurement of property or services which Congress contemplated including within the scope of the Contract Disputes Act.

We are also not convinced that the transaction was a "barter" contract as found by the Claims Court to support its holding that the CDA was applicable. The September 23, 1983 document merely conditioned acceptance of the LAV virus samples on a promise to refrain from sharing them without permission from Pasteur. Neither that promise nor the Government's implied promise to share the results of future experiments with Pasteur can be considered "specific property susceptible of valuation," as would be required for barter. Black's Law Dictionary 1200 (5th ed. 1979).

Finally, application of complex, burdensome, and inevitably time-consuming procurement regulations to the type of scientific collaboration here involved would "not do justice to the realities of the situation." *Texas State Comm'n For The Blind*, 796 F.2d at 406. The exchange of information and perishable biological products among scientists engaged in collaborative research relating to deadly diseases such as AIDS should not be required to await compliance with procurement regulations such as

those requiring a documented determination by a contracting officer that the contractor (here, Pasteur) is "responsible," 41 C.F.R. §§ 1-1.12, 3-1.12 (1983), or a written justification for contracting on a noncompetitive basis, 41 C.F.R. § 3-3.5301 (1983). Moreover, the numerous form clauses required by federal procurement regulations would have no applicability to this type of collaborative research effort. See, e.g., 41 C.F.R. §§ 1-1.318-7, 1-7 (1983). Confirmatory of this is the fact that HHS itself has used a form similar to Pasteur's September 23, 1983 agreement when sending cell lines to other laboratories.

For the foregoing reasons, we are persuaded that the primary function of the pleaded contracts was facilitation of the transfer of research materials among scientists engaged in a collaborative research effort, not procurement of property or services, and that they, therefore, do not fit within the scope of the Contract Disputes Act. Accordingly, we reverse the judgment of the Claims Court and remand the case for consideration of whether there is a valid and enforceable contract, and, if so, whether it has been breached.

REVERSED and REMANDED.



VERDEGAAL BROTHERS, INC.,

William Verdegaal, George
Verdegaal, Appellees,

v.

UNION OIL COMPANY OF CALIFORNIA, Brea Agricultural Services,
Inc., Appellants.

Appeal No. 86-1258.

United States Court of Appeals,
Federal Circuit.

March 12, 1987.

Action was instituted for alleged patent infringement. The United States Dis-

a documented determination of the contracting officer that the contractor is "responsible," 41 C.F.R. § 3-1.12 (1983), or a written contracting on a noncom- 1 C.F.R. § 3-3.5301 (1983). numerous form clauses real procurement regulations applicability to this type of search effort. See, e.g., 41 8-7, 1-7 (1983). Confirmation of the fact that HHS itself has similar to Pasteur's September 1987 when sending cell lines arises.

For the reasons, we are persuaded that the primary function of the contract was facilitation of the exchange of materials among scientists and a collaborative research arrangement of property or service, therefore, do not fit within the Contract Disputes Act. Accordingly, we reverse the judgment of the District Court and remand the case for determination of whether there is a enforceable contract, and, if so, whether it has been breached.

REMANDED.



VERDEGAAL BROS., INC.,
Verdegaal, George
Verdegaal, Appellees,
v.
UNION OIL CO. OF CALIFORNIA
Agricultural Services,
Appellants.
No. 86-1258.
The United States Court of Appeals,
Ninth Circuit.
March 12, 1987.

instituted for alleged patent infringement. The United States Dis-

District Court for the Eastern District of California, Robert E. Coyle, J., entered judgment on verdict for plaintiff, declaring patent valid and infringed, and defendants appealed. The Court of Appeals, Nies, Circuit Judge, held that patent relating to a process for making urea-sulfuric acid liquid fertilizer by reacting water, urea, a nitrogen-containing chemical, and sulfuric acid, a sulfur-containing chemical, in particular proportions was anticipated by prior art reference disclosing processes for making both urea-phosphoric acid and urea-sulfuric acid fertilizers and was invalid.

Reversed.
See also, Fed.Cir., 750 F.2d 947.

- 1. Federal Civil Procedure** § 2609
A district court presented with a motion for judgment notwithstanding the verdict should consider all of the evidence, in a light most favorable to nonmoving party, drawing all reasonable inferences favorable to that party, without determining credibility of witnesses, and without substituting its choice for that of the jury and deciding between conflicting elements of the evidence, and should grant the motion only when it is convinced upon the record before the jury that reasonable persons could not have reached a verdict for the nonmoving party. 35 U.S.C.A. §§ 102, 103; Fed.Rules Civ.Proc.Rule 50(a, b), 28 U.S.C.A.
- 2. Federal Civil Procedure** § 2608
Party moving for judgment notwithstanding the verdict must show that either the jury's factual findings are not supported by substantial evidence, or, if they are, that those findings cannot support the legal conclusions which necessarily were drawn by the jury and forming its verdict. 35 U.S.C.A. §§ 102, 103; Fed.Rules Civ.Proc.Rule 50(a, b), 28 U.S.C.A.
- 3. Patents** § 36(2)
Presumption of validity afforded a patent requires that party challenging validity prove facts establishing invalidity by clear and convincing evidence. 35 U.S.C.A. § 282.

- 4. Patents** § 72(1)
A claim is anticipated only if each and every element as set forth in claim is found, either expressly or inherently described, in a single prior art reference. 35 U.S.C.A. § 102(e).
- 5. Patents** § 66(1.12)
Patent relating to a process for making urea-sulfuric acid liquid fertilizer by reacting water, urea, a nitrogen-containing chemical, and sulfuric acid, a sulfur-containing chemical, in particular proportions was anticipated by prior art reference disclosing processes for making both urea-phosphoric acid and urea-sulfuric acid fertilizers and was invalid. 35 U.S.C.A. §§ 102(e), 282.
- 6. Patents** § 72(1)
It was inappropriate for holder of patented fertilizer process to rely on fact that sulfuric acid was added slowly in prior art reference, whereas claimed process allowed for rapid addition, where there was no limitation in subject process with respect to rate at which sulfuric acid was added. 35 U.S.C.A. §§ 102(e), 282.
- 7. Patents** § 62(1)
Discarding testimony of experts with respect to what prior art reference taught did not eliminate reference itself as evidence or its uncontradicted disclosure that a base of recycled fertilizer in a process could be used to make more of the product and, hence, did not preclude conclusion that claimed process for making liquid fertilizer was invalid as anticipated by prior art. 35 U.S.C.A. §§ 102(e), 282.
- 8. Patents** § 72(1)
Failure of prior art reference to explicitly identify heel in process for manufacturing liquid fertilizer as a heat sink did not preclude reference from anticipating claimed process, thus requiring a finding of invalidity, where fact that heel functioned as a heat sink was inherent in prior art reference. 35 U.S.C.A. §§ 102(e), 282.

Andrew J. Belansky, Christie, Parker & Hale, Pasadena, Cal., argued for appel-

lants. With him on the brief was David A. Dillard.

John P. Sutton, Limbach, Limbach & Sutton, San Francisco, Cal., argued for appellees. With him on the brief was Michael E. Dergosits.

Before MARKEY, Chief Judge, and DAVIS and NIES, Circuit Judges.

NIES, Circuit Judge.

Union Oil Company of California and Brea Agricultural Services, Inc. (collectively Union Oil) appeal from a judgment of the United States District Court for the Eastern District of California, No. CV-F-83-68 REC, entered on a jury verdict which declared U.S. Patent No. 4,310,343 ('343), owned by Verdegaal Brothers, Inc., "valid" and claims 1, 2, and 4 thereof infringed by Union Oil. Union Oil's motion for judgment notwithstanding the verdict (JNOV) was denied. We reverse.

I

BACKGROUND

The General Technology

The patent in suit relates to a process for making certain known urea-sulfuric acid liquid fertilizer products. These products are made by reacting water, urea (a nitrogen-containing chemical), and sulfuric acid (a sulfur-containing chemical) in particular proportions. The nomenclature commonly used by the fertilizer industry refers to these fertilizer products numerically according to the percentages by weight of four fertilizer constituents in the following order: nitrogen, phosphorous, potassium, and sulfur. Thus, for example, a fertilizer containing 28% nitrogen, no phosphorous or potassium, and 9% sulfur is expressed numerically as 28-0-0-9.

The Process of the '343 Patent

The process disclosed in the '343 patent involves the chemical reaction between urea and sulfuric acid, which is referred to as an exothermic reaction because it gives off heat. To prevent high temperature buildup, the reaction is conducted in the

presence of a nonreactive, nutritive heat sink which will absorb the heat of reaction. Specifically, a previously-made batch of liquid fertilizer—known as a "heel"—can serve as the heat sink to which more reactants are added. Claims 1 and 2 are representative:

1. In a process for making a concentrated liquid fertilizer by reacting sulfuric acid and urea, to form an end product, the improvement comprising:

- a. providing a non-reactive, nutritive heat sink, capable of dissipating the heat of urea and sulfuric acid, in an amount at least 5% of the end product,
- b. adding water to the heat sink in an amount not greater than 15% of the end product,
- c. adding urea to the mixture in an amount of at least 50% of the total weight of the end product,
- d. adding concentrated sulfuric acid in an amount equal to at least 10% of the total weight of the end product.

2. The process of claim 1 wherein the heat sink is recycled liquid fertilizer.

Procedural History

Verdegaal brought suit against Union Oil in the United States District Court for the Eastern District of California charging that certain processes employed by Union Oil for making liquid fertilizer products infringed all claims of its '343 patent. Union Oil defended on the grounds of non-infringement and patent invalidity under 35 U.S.C. §§ 102, 103. The action was tried before a jury which returned a verdict consisting of answers to five questions. Pertinent here are its answers that the '343 patent was "valid" over the prior art, and that certain of Union Oil's processes infringed claims 1, 2, and 4 of the patent. None were found to infringe claims 3 or 5. Based on the jury's verdict, the district court entered judgment in favor of Verdegaal.

Having unsuccessfully moved for a directed verdict under Fed.R.Civ.P. 50(a), Union Oil timely filed a motion under Rule 50(b) for JNOV seeking a judgment that the claims of the '343 patent were invalid

under sections 102 and 103. The district court denied the motion without opinion.

II

ISSUE PRESENTED

Did the district court err in denying Union Oil's motion for JNOV with respect to the validity of claims 1, 2, and 4 of the '343 patent?

III

Standard of Review

[1] When considering a motion for JNOV a district court must: (1) consider all of the evidence; (2) in a light most favorable to the non-moving party; (3) drawing all reasonable inferences favorable to that party; (4) without determining credibility of the witnesses; and (5) without substituting its choice for that of the jury's in deciding between conflicting elements of the evidence. *Railroad Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, 1512-13, 220 USPQ 929, 936 (Fed.Cir.), *cert. denied*, 469 U.S. 871, 105 S.Ct. 220, 83 L.Ed.2d 150 (1984); *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1546, 220 USPQ 193, 197 (Fed.Cir.1983). A district court should grant a motion for JNOV only when it is convinced upon the record before the jury that reasonable persons could not have reached a verdict for the nonmoving party. *Railroad Dynamics*, 727 F.2d at 1513, 220 USPQ at 936; *Connell*, 722 F.2d at 1546, 220 USPQ at 197.

[2] To reverse the district court's denial of the motion for JNOV, Union Oil must convince us that either the jury's factual findings are not supported by substantial evidence, or, if they are, that those findings cannot support the legal conclusions which necessarily were drawn by the jury in forming its verdict. *See Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888, 893, 221 USPQ 669, 673 (Fed.Cir.), *cert. denied*, 469 U.S. 857, 105 S.Ct. 187, 83 L.Ed.2d 120 (1984); *Railroad Dynamics*, 727 F.2d at 1512, 220 USPQ at 936. Substantial evidence is more than just a mere

scintilla; it is such relevant evidence from the record taken as a whole as a reasonable mind might accept as adequate to support the finding under review. *Consolidated Edison Co. v. NLRB*, 305 U.S. 197, 229, 59 S.Ct. 206, 216, 83 L.Ed. 126 (1938); *Perkin-Elmer*, 732 F.2d at 893, 221 USPQ at 673; *SSIH Equip. S.A. v. U.S. Int'l Trade Comm'n*, 718 F.2d 365, 371 n. 10, 218 USPQ 678, 684 n. 10 (Fed.Cir.1983). A trial court's denial of a motion for JNOV must stand unless the evidence is of such quality and weight that reasonable and fair-minded persons in the exercise of impartial judgment could not reasonably return the jury's verdict. *Envirotech Corp. v. Al George, Inc.*, 730 F.2d 753, 758, 221 USPQ 473, 477 (Fed.Cir.1984).

[3] Our precedent holds that the presumption of validity afforded a U.S. patent by 35 U.S.C. § 282 requires that the party challenging validity prove the facts establishing invalidity by clear and convincing evidence. *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360, 220 USPQ 763, 770 (Fed.Cir.), *cert. denied*, 469 U.S. 821, 105 S.Ct. 95, 83 L.Ed.2d 41 (1984). Thus, the precise question to be resolved in this case is whether Union Oil's evidence is so clear and convincing that reasonable jurors could only conclude that the claims in issue were invalid. *See Perkin-Elmer*, 732 F.2d at 893, 221 USPQ at 673; *Railroad Dynamics*, 727 F.2d at 1511, 220 USPQ at 935.

Anticipation

[4] A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *See, e.g., Structural Rubber Prods. Co. v. Park Rubber Co.*, 749 F.2d 707, 715, 223 USPQ 1264, 1270 (Fed.Cir.1984); *Connell*, 722 F.2d at 1548, 220 USPQ at 198; *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771, 218 USPQ 781, 789 (Fed.Cir.1983), *cert. denied*, 465 U.S. 1026, 104 S.Ct. 1284, 79 L.Ed.2d 687 (1984). Union Oil asserts that the subject claims of the '343 patent

are anticipated under 35 U.S.C. § 102(e)¹ by the teachings found in the original application for U.S. Patent No. 4,315,763 to Stoller, which the jury was instructed was prior art.

[5] From the jury's verdict of patent validity, we must presume that the jury concluded that Union Oil failed to prove by clear and convincing evidence that claims 1, 2, and 4 were anticipated by the Stoller patent. See *Perkin-Elmer*, 732 F.2d at 893, 221 USPQ at 673; *Railroad Dynamics*, 727 F.2d at 1516, 220 USPQ at 939. Under the instructions of this case, this conclusion could have been reached only if the jury found that the Stoller patent did not disclose each and every element of the claimed inventions. Having reviewed the evidence, we conclude that substantial evidence does not support the jury's verdict, and, therefore, Union Oil's motion for JNOV on the grounds that the claims were anticipated should have been granted.

The Stoller patent discloses processes for making both urea-phosphoric acid and urea-sulfuric acid fertilizers. Example 8 of Stoller specifically details a process for making 30-0-0-10 urea-sulfuric acid products. There is no dispute that Example 8 meets elements b, c, and d of claim 1, specifically the steps of adding water in an amount not greater than 15% of the product, urea in an amount of at least 50% of the product, and concentrated sulfuric acid in an amount of at least 10% of the product. Verdegaal disputes that Stoller teaches element a, the step of claim 1 of "providing a non-reactive, nutritive heat sink." As set forth in claim 2, the heat sink is recycled fertilizer.²

The Stoller specification, beginning at column 7, line 30, discloses:

Once a batch of liquid product has been made, it can be used as a base for

1. Section 102(e) provides:

A person shall be entitled to a patent unless—

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs

further manufacture. This is done by placing the liquid in a stirred vessel of appropriate size, adding urea in sufficient quantity to double the size of the finished batch, adding any water required for the formulation, and slowly adding the sulfuric acid while stirring. Leaving a heel of liquid in the vessel permits further manufacture to be conducted in a stirred fluid mass.

This portion of the Stoller specification explicitly teaches that urea and sulfuric acid can be added to recycled fertilizer, i.e., a heel or base of previously-made product. Dr. Young, Union Oil's expert, so testified. Verdegaal presented no evidence to the contrary.

[6] Verdegaal first argues that Stoller does not anticipate because in Stoller's method sulfuric acid is added *slowly*, whereas the claimed process allows for rapid addition. However, there is no limitation in the subject claims with respect to the rate at which sulfuric acid is added, and, therefore, it is inappropriate for Verdegaal to rely on that distinction. See *SSIH*, 718 F.2d at 378, 218 USPQ at 689. It must be assumed that slow addition would not change the claimed process in any respect including the function of the recycled material as a heat sink.

[7] Verdegaal next argues that the testimony of Union Oil's experts with respect to what Stoller teaches could well have been discounted by the jury for bias. Discarding that testimony does not eliminate the reference itself as evidence or its uncontradicted disclosure that a base of recycled fertilizer in a process may be used to make more of the product.

[8] Verdegaal raises several variations of an argument, all of which focus on the

(1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. Claim 4 is written in terms of approximate percentages of all reactants by weight of the end product. No argument is made that the process of claim 4 would result in a fertilizer product any different from that disclosed by Example 8 of Stoller.

failure of Stoller to explicitly identify the heel in his process as a "heat sink." In essence, Verdegaa! maintains that because Stoller did not recognize the "inventive concept" that the heel functioned as a heat sink, Stoller's process cannot anticipate. This argument is wrong as a matter of fact and law. Verdegaa!'s own expert, Dr. Bahme, admitted that Stoller discussed the problem of high temperature caused by the exothermic reaction, and that the heel could function as a heat sink.³ In any event, Union Oil's burden of proof was limited to establishing that Stoller disclosed the same process. It did not have the additional burden of proving that Stoller recognized the heat sink capabilities of using a heel. Even assuming Stoller did not recognize that the heel of his process functioned as a heat sink, that property was inherently possessed by the heel in his disclosed process, and, thus, his process anticipates the claimed invention. See *In re Oelrich*, 666 F.2d 578, 581, 212 USPQ 323, 326 (CCPA 1981); *In re Swinehart*, 439 F.2d 210, 212-13, 169 USPQ 226, 229 (CCPA 1971). The pertinent issues are whether Stoller discloses the process of adding urea and sulfuric acid to a previously-made batch of product, and whether that base would in fact act as a heat sink. On the entirety of the record, these issues could only be resolved in the affirmative.

On appeal Verdegaa! improperly attempts to attack the status of the Stoller patent as prior art, stating in its brief:

Verdegaa! also introduced evidence at trial that the Stoller patent is not prior art under 35 U.S.C. §§ 102(e)/103. Professor Chisum testified that the Stoller patent, in his opinion, was not prior art.... This conclusion finds support in

3. There is no dispute that the percentage of heel described in Stoller meets the percentage of heat sink required by the claims.

4. The jury instruction read:
Stoller filed two patent applications—an original application on October 30th, 1978, and a second on February 7th, 1980. Under the patent laws, the claims of the 343 patent are invalid if you find that the original application (Exhibit BL) anticipates the process claimed in the 343 patent.

In re Wertheim, 646 F.2d 527. (CCPA 1981), and 1 Chisum on Patents § 3.07[3]. Appellee Brief at 27 (record cite omitted). Seldom have we encountered such blatant distortion of the record. A question about the status of the Stoller disclosure as prior art did arise at trial. Union Oil asserted that, even though the Stoller patent issued after the '343 patent, Stoller was prior art under section 102(e) as of its filing date which was well before the filing date of Verdegaa!'s application. Professor Chisum never testified that the Stoller patent was not prior art, but rather, stated that *he did not know* whether it was prior art. An excerpt from the pertinent testimony leaves no doubt on this point:

Q. (Mr. Sutton): And do you know whether the Stoller patent is prior art to the application of the Verdegaa! patent?

A. (Prof. Chisum): I don't know that it is, no.

We find it even more incredible that Verdegaa! would attempt to raise an issue with respect to the status of the Stoller patent given that the case was submitted to the jury with the instruction that the original Stoller patent application was prior art.⁴ Verdegaa! made no objection to that instruction below, and in its appeal briefs, the instruction is cavalierly ignored.

In sum, Verdegaa! is precluded from arguing that the Stoller patent should not be considered prior art. See Fed.R.Civ.P. 51; *Weinar v. Rollform Inc.*, 744 F.2d 797, 808, 223 USPQ 369, 375 (Fed.Cir.1984), *cert. denied*, 470 U.S. 1084, 105 S.Ct. 1844, 85 L.Ed.2d 143 (1985); *Bio-Rad Laboratories, Inc. v. Nicolet Instrument Corp.*, 739 F.2d 604, 615, 222 USPQ 654, 662 (Fed. Cir.), *cert. denied*, 469 U.S. 1038, 105 S.Ct. 516, 83 L.Ed.2d 405 (1984).⁵

5. Union Oil also argues that Verdegaa!'s counsel misled the jury by its closing rebuttal argument:

[B]ut I think it's important to keep in mind that [Stoller] couldn't have been a prior patent because it issued a month after the Verdegaa! patent had issued.

We disapprove of Verdegaa!'s tactic which would form the basis for a grant of a motion for a new trial but for our conclusion that outright reversal of the ruling on the motion for JNOV is in order.

After considering the record taken as a whole, we are convinced that Union Oil established anticipation of claims 1, 2, and 4 by clear and convincing evidence and that no reasonable juror could find otherwise. Consequently, the jury's verdict on validity is unsupported by substantial evidence and cannot stand. Thus, the district court's denial of Union Oil's motion for JNOV must be reversed.

Conclusion

Because the issues discussed above are dispositive of this case, we do not find it necessary to reach the other issues raised by Union Oil.⁶ In accordance with this opinion, we reverse the portion of the judgment entered on the jury verdict upholding claims 1, 2, and 4 of the '343 patent as valid under section 102(e) and infringed.

REVERSED.



Richard J. Sisson, Appellee,

v.

The UNITED STATES, Appellant.

Appeal No. 86-1485.

United States Court of Appeals,
Federal Circuit.

March 17, 1987.

Air Force master sergeant was court-martialed and convicted of charges that he violated Air Force regulation by making personal commercial solicitations of lower-ranking enlisted members and violated a command directive by engaging in outside commercial activity for compensation without approval of his immediate commanders. After exhausting military remedies, ser-

6. It should not be inferred that all of these issues were properly before us. Union Oil appears to assume that on appeal it may dispute the resolution of any issue which is denom-

geant brought suit challenging the regulations. The United States District Court for the District of Arizona, Alfredo C. Marquez, J., 630 F.Supp. 1026, voided the court-martial, and Government appealed. The Court of Appeals, Davis, Circuit Judge, held that: (1) sergeant had proper notice that regulation prohibited group solicitations; (2) court-martial could permissibly find that sergeant also made one-on-one solicitations of lower ranking enlisted members; and (3) there was no violation of due process in applying directive to sergeant, even though directive was adopted after he became member of the military and began to engage in outside commercial activity, because sergeant should have known of directive, whether or not he had actual knowledge.

Reversed.

1. Constitutional Law §278.6(2)

Air Force master sergeant who was court-martialed and convicted on charge that he violated Air Force regulation by making personnel commercial solicitations of lower-ranking enlisted members had fair notice that regulation prohibited group solicitations by a superior as well as one-on-one solicitations, and thus his conviction is not in violation of his constitutional rights; moreover, court-martial could have permissibly found that sergeant also made one-on-one solicitations.

2. Armed Services §36

Constitutional Law §278.6(2)

It was not a violation of due process to apply Air Force command directive requiring approval of immediate commanders before engaging in gainful outside activity to Air Force master sergeant, even though directive was adopted after sergeant became a member of the military and began to engage in commercial activities, and there was no showing that he knew about directive; there was sufficient evidence to find that sergeant should have known of

inated an "issue of law" even though it was not raised in its motion for JNOV. This is incorrect. See *Railroad Dynamics*, 727 F.2d at 1511, 220 USPQ at 934.

nell "assumed the risk of unavailable milling time", and that Connell's contract obligations were not conditioned thereon.

[3] Both the board, and the government in its brief, offer theories as to how Connell might have managed, at whatever cost, to obtain milled rice for timely delivery. These theories, in view of the USDA regulations, are relevant only to the question of whether Connell's failure to perform was "beyond [its] control and without [its] fault or negligence". If the government created the situation that caused or contributed to Connell's late delivery, it can not be held as a matter of law that Connell was required to exceed reasonable efforts in order to compensate for this unwarranted government action.

The government cites *Jennie-O Foods, Inc., v. United States*, 580 F.2d 400, 409-10 (Ct.Cl.1978), which held that "unanticipated economic hardship" did not excuse failure to perform where the contractor had not shown that "the product (healthy turkeys) was unavailable within the boundaries of a reasonable area." There was no issue in *Jennie-O* of governmental contribution to the failure to perform; nor was a theory of strict liability applied. The issues there raised, as here, are fact-dependent, and in *Jennie-O* were fully developed at trial.

[4] Connell must be enabled to develop the facts pertinent to its defense that the government, acting in its sovereign or contractual capacities, contributed to the delay; the extent of that contribution; and whether Connell was at fault or negligent; for these facts are material to the issues of liability, and the extent thereof. The determination must be made as to whether exculpation has been shown under the circumstances. Public policy and the national interest, as well as the principles of contract law, so require. As the Court explained in *United States v. Brooks-Calloway Co.*, 318 U.S. 120, 122, 63 S.Ct. 474, 476, 87 L.Ed. 653 (1943), the purpose of the standard proviso in government contracts that authorizes such relief is:

Thus contractors know they are not to be penalized for unexpected impediments to prompt performance, and, since their

bids can be based on foreseeable and probable, rather than possible hindrances, the Government secures the benefit of lower bids and an enlarged selection of bidders.

Although the government argues that Connell "failed to meet its burden" on summary judgment, the denial of discovery related to this defense contributed to this failure.

REVERSED AND REMANDED.



In re David H. FINE

No. 87-1319.

United States Court of Appeals,
Federal Circuit.

Jan. 26, 1988.

The Board of Patent Appeals and Interferences of the United States Patent and Trademark Office affirmed rejection of claims of application for patent for system for detecting and measuring minute quantities of nitrogen compounds, and applicant appealed. The Court of Appeals, Mayer, Circuit Judge, held that: (1) it would not have been obvious to substitute nitric oxide detector for sulfur dioxide detector in prior system, and (2) sulfur detection system did not teach use of claimed temperature range.

Reversed.

Edward S. Smith, Circuit Judge, dissented and filed opinion.

1. Patents \S 16.33

System for detecting and measuring minute quantities of nitrogen compounds was not obvious in light of prior art for separating, identifying, and monitoring sulfur compounds or method for measuring chemiluminescence of reaction between ni-

tric oxide and ozone which required continuous flowing of gaseous mixture into reaction chamber; method for measuring sulfur deliberately sought to avoid nitrogen compounds, and claimed invention retained each nitrogen compound constituent of gaseous sample in chromatograph for individual time period. 35 U.S.C.A. § 103.

2. Patents \Rightarrow 114.19, 114.21

Patent and Trademark Office has burden to establish prima facie case of obviousness, which it may satisfy only by showing some objective teaching in prior art, or that knowledge generally available to one of ordinary skill and art would lead that individual to combined relevant teachings of references. 35 U.S.C.A. § 103.

3. Patents \Rightarrow 26(1)

Whether particular combination might be "obvious to try" is not legitimate test of patentability. 35 U.S.C.A. § 103.

4. Patents \Rightarrow 16.5

Patent which described preferred temperature range for separating, identifying and quantitatively monitoring sulfur compounds could be distinguished from claimed method for detecting and measuring minute quantities of nitrogen compounds which limited temperature to prevent nitrogen from other sources, where purpose of temperature limitation in prior art was to avoid formation of unwanted sulfides.

Morris Relson, Darby & Darby, P.C., New York City, for appellant. With him on the brief was Beverly B. Goodwin.

Lee E. Barrett, Associate Sol., Office of the Solicitor, Arlington, Va., for appellee. With him on the brief were Joseph F. Nakamura, Sol. and Fred E. McKelvey, Deputy Sol.

Before FRIEDMAN, SMITH and
MAYER, Circuit Judges.

OPINION

MAYER, Circuit Judge.

David H. Fine appeals from a decision of the Board of Patent Appeals and Interfer-

ences of the United States Patent and Trademark Office (Board) affirming the rejection of certain claims of his application, Serial No. 512,374, and concluding that his invention would have been obvious to one of ordinary skill in the art and was therefore unpatentable under 35 U.S.C. § 103. We reverse.

BACKGROUND

A. The Invention.

The invention claimed is a system for detecting and measuring minute quantities of nitrogen compounds. According to Fine, the system has the ability to detect the presence of nitrogen compounds in quantities as minute as one part in one billion, and is an effective means to detect drugs and explosives, which emanate nitrogen compound vapors even when they are concealed in luggage and closed containers.

The claimed invention has three major components: (1) a gas chromatograph which separates a gaseous sample into its constituent parts; (2) a converter which converts the nitrogen compound effluent output of the chromatograph into nitric oxide in a hot, oxygen-rich environment; and (3) a detector for measuring the level of nitric oxide. The claimed invention's sensitivity is achieved by combining nitric oxide with ozone to produce nitrogen dioxide which concurrently causes a detectable luminescence. The luminescence, which is measured by a visual detector, shows the level of nitric oxide which in turn is a measure of nitrogen compounds found in the sample.

The appealed claims were rejected by the Patent and Trademark Office (PTO) under 35 U.S.C. § 103. Claims 60, 63, 77 and 80 were rejected as unpatentable over Eads, Patent No. 3,650,696 (Eads) in view of Warnick, et al., Patent No. 3,746,513 (Warnick). Claims 62, 68, 69, 79, 85 and 86 were rejected as unpatentable over Eads and Warnick in view of Glass, et al., Patent No. 3,207,585 (Glass).

B. The Prior Art.

1. Eads Patent.

Eads discloses a method for separating, identifying and quantitatively monitoring

sulfur compounds. The Eads system is used primarily in "air pollution control work in the scientific characterization of odors from sulfur compounds."

The problem addressed by Eads is the tendency of sulfur compounds "to adhere to or react with the surface materials of the sampling and analytical equipment, and/or react with the liquid or gaseous materials in the equipment." Because of this, the accuracy of measurement is impaired. To solve the problem, the Eads system collects an air sample containing sulfur compounds in a sulfur-free methanol solution. The liquid is inserted into a gas chromatograph which separates the various sulfur compounds. The compounds are next sent through a pyrolysis furnace where they are oxidized to form sulfur dioxide. Finally, the sulfur dioxide passes through a measuring device called a micro-coulometer which uses titration cells to calculate the concentration of sulfur compounds in the sample.

2. Warnick Patent.

Warnick is directed to a means for detecting the quantity of pollutants in the atmosphere. By measuring the chemiluminescence of the reaction between nitric oxide and ozone, the Warnick device can detect the concentration of nitric oxide in a sample gaseous mixture.

Warnick calls for "continuously flowing" a sample gaseous mixture and a reactant containing ozone into a reaction chamber. The chemiluminescence from the resulting reaction is transmitted through a light-transmitting element to produce continuous readouts of the total amount of nitric oxide present in the sample.

3. Glass Patent.

The invention disclosed in Glass is a device for "completely burning a measured amount of a substance and analyzing the combustion products." A fixed amount of a liquid petroleum sample and oxygen are supplied to a flame. The flame is then spark-ignited, causing the sample to burn. The resulting combustion products are then collected and measured, and from this mea-

surement the hydrogen concentration in the sample is computed.

C. The Rejection.

The Examiner rejected claims 60, 63, 77 and 80 because "substitution of the [nitric oxide] detector of Warnick for the sulfur detector of Eads would be an obvious consideration if interested in nitrogen compounds, and would yield the claimed invention." He further asserted that "Eads teaches the [claimed] combination of chromatograph, combustion, and detection, in that order. . . . Substitution of detectors to measure any component of interest is well within the skill of the art." In rejecting claims 62, 68, 69, 79, 85 and 86, the Examiner said, "Glass et al. teach a flame conversion means followed by a detector, and substitution of the flame conversion means of Glass et al. for the furnace of Eads would be an obvious equivalent and would yield the claimed invention." The Board affirmed the Examiner's rejection.

DISCUSSION

A. Standard of Review.

Obviousness under 35 U.S.C. § 103 is "a legal conclusion based on factual evidence." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1535, 218 USPQ 871, 876 (Fed.Cir.1983) (quoting *Stevenson v. Int'l Trade Comm'n*, 612 F.2d 546, 549, 204 USPQ 276, 279 (CCPA 1979)). Therefore, an obviousness determination is not reviewed under the clearly erroneous standard applicable to fact findings, *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed.Cir.1983); it is "reviewed for correctness or error as a matter of law." *In re De Blauwe*, 736 F.2d 699, 703, 222 USPQ 191, 195 (Fed.Cir.1984).

To reach a proper conclusion under § 103, the decisionmaker must step backward in time and into the shoes worn by [a person having ordinary skill in the art] when the invention was unknown and just before it was made. In light of all the evidence, the decisionmaker must then determine whether . . . the claimed invention as a whole would have been

obvious at that time to that person. 35 U.S.C. § 103. The answer to that question partakes more of the nature of law than of fact, for it is an ultimate conclusion based on a foundation formed of all the probative facts.

Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1566, 1 USPQ2d 1593, 1595-96 (Fed.Cir.1987).

B. Prima Facie Obviousness.

Fine says the PTO has not established a *prima facie* case of obviousness. He contends the references applied by the Board and Examiner were improperly combined, using hindsight reconstruction, without evidence to support the combination and in the face of contrary teachings in the prior art. He argues that the appealed claims were rejected because the PTO thought it would have been "obvious to try" the claimed invention, an unacceptable basis for rejection.

[1, 2]. We agree. The PTO has the burden under section 103 to establish a *prima facie* case of obviousness. See *In re Pia-secki*, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed.Cir.1984). It can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. *In re Lulu*, 747 F.2d 703, 705, 223 USPQ 1257, 1258 (Fed.Cir.1984); see also *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n. 24, 227 USPQ 657, 667 n. 24 (Fed.Cir.1985); *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir.1984). This it has not done. The Board points to nothing in the cited references, either alone or in combination, suggesting or teaching Fine's invention.

The primary basis for the Board's affirmation of the Examiner's rejection was that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. The Board reiterated the Examiner's bald assertion that "substitution of one type of detector for another in the system of Eads

would have been within the skill of the art," but neither of them offered any support for or explanation of this conclusion.

Eads is limited to the analysis of sulfur compounds. The particular problem addressed there is the difficulty of obtaining precise measurements of sulfur compounds because of the tendency of sulfur dioxide to adhere to or react with the sampling analytic equipment or the liquid or gaseous materials in the equipment. It solves this problem by suggesting that the gaseous sample containing sulfur compounds be absorbed into sulfur-free methanol and then inserted into a gas chromatograph to separate the sulfur compounds.

There is no suggestion in Eads, which focuses on the unique difficulties inherent in the measurement of sulfur, to use that arrangement to detect nitrogen compounds. In fact, Eads says that the presence of nitrogen is undesirable because the concentration of the titration cell components in the sulfur detector is adversely affected by substantial amounts of nitrogen compounds in the sample. So, instead of suggesting that the system be used to detect nitrogen compounds, Eads deliberately seeks to avoid them; it warns against rather than teaches Fine's invention. See *W.L. Gore & Assoc. v. Garlock, Inc.*, 721 F.2d 1540, 1550, 220 USPQ 303, 311 (Fed.Cir. 1983) (error to find obviousness where references "diverge from and teach away from the invention at hand"). In the face of this, one skilled in the art would not be expected to combine a nitrogen-related detector with the Eads system. Accordingly, there is no suggestion to combine Eads and Warnick.

Likewise, the teachings of Warnick are inconsistent with the claimed invention, to some extent. The Warnick claims are directed to a gas stream from engine exhaust "continuously flowing the gaseous mixtures into the reaction chamber" to obtain "continuous readouts" of the amount of nitric oxide in the sample. In other words, it contemplates measuring the total amount of nitric oxide in a continuously flowing gaseous mixture of unseparated nitrogen constituents. By contrast, in Fine each

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Cite as 837 F.2d 1071 (Fed. Cir. 1988)

nitrogen compound constituent of the gaseous sample is retained in the chromatograph for an individual time period so that each exits in discrete, time-separated pulses.* By this process, each constituent may be both identified by its position in time sequence, and measured. The claimed system, therefore, diverges from Warnick and teaches advantages not appreciated or contemplated by it.

[3] Because neither Warnick nor Eads, alone or in combination, suggests the claimed invention, the Board erred in affirming the Examiner's conclusion that it would have been obvious to substitute the Warnick nitric oxide detector for the Eads sulfur dioxide detector in the Eads system. *ACS Hosp. Sys.*, 732 F.2d at 1575-77, 221 USPQ at 931-33. The Eads and Warnick references disclose, at most, that one skilled in the art might find it obvious to try the claimed invention. But whether a particular combination might be "obvious to try" is not a legitimate test of patentability. *In re Geiger*, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed.Cir.1987); *In re Goodwin*, 576 F.2d 375, 377, 198 USPQ 1, 3 (CCPA 1978).

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. And "teachings of references can be combined *only* if there is some suggestion or incentive to do so." *Id.* Here, the prior art contains none.

Instead, the Examiner relies on hindsight in reaching his obviousness determination. But this court has said, "To imbue one of ordinary skill in the art with knowledge of

the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher." *W.L. Gore*, 721 F.2d at 1553, 220 USPQ at 312-13. It is essential that "the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made ... to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art." *Id.* One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

C. Advantage Not Appreciated by the Prior Art.

[4] The Board erred not only in improperly combining the Eads and Warnick references but also in failing to appreciate that the appealed claims can be distinguished over that combination. A material limitation of the claimed system is that the conversion to nitric oxide occur in the range of 600°C to 1700°C. The purpose of this limitation is to prevent nitrogen from other sources, such as the air, from being converted to nitric oxide and thereby distorting the measurement of nitric oxide derived from the nitrogen compounds of the sample.

The claimed nitric oxide conversion temperature is not disclosed in Warnick. Although Eads describes a preferred temperature of 675°C to 725°C, the purpose of this range is different from that of Fine. Eads requires the 675°C to 725°C range because it affords a temperature low enough to avoid formation of unwanted sulfur trioxide, yet high enough to avoid formation of unwanted sulfides. Fine's temperature

* The Solicitor argues that the contents of Attachment C of Fine's brief were not before the Board and may not properly be considered here. However, we need not rely on Attachment C. It is merely illustrative of the qualitative separation of nitrogen compounds which occurs in Fine's system. The fact that the vari-

ous constituents exit at discrete intervals is shown by the specification which was before the Board and which may appropriately be considered on appeal. See, e.g., *Astra-Sjuco, A.B. v. United States Int'l Trade Comm'n*, 629 F.2d 682, 686, 207 USPQ 1, 5 (CCPA 1980) (claims must be construed in light of specification).

range, in contrast, does not seek to avoid the formation of sulfur compounds or even nitrogen compounds. It enables the system to break down the nitrogen compounds of the sample while avoiding the destruction of background nitrogen gas. There is a partial overlap, of course, but this is mere happenstance. Because the purposes of the two temperature ranges are entirely unrelated, Eads does not teach use of the claimed range. See *In re Geiger*, 815 F.2d at 688, 2 USPQ2d at 1278. The Board erred by concluding otherwise.

D. Unexpected Results.

Because we reverse for failure to establish a *prima facie* case of obviousness, we need not reach Fine's contention that the Board failed to accord proper weight to the objective evidence of unexpected superior results. *Id.*

E. The "Flame" Claims.

Claims 62, 68, 69, 79, 85 and 86 relate to the oxygen-rich flame conversion means of the claimed invention. These "flame" claims depend from either apparatus claim 60 or method claim 77. Dependent claims are nonobvious under section 103 if the independent claims from which they depend are nonobvious. *Hartness Int'l, Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed.Cir.1987); *In re Abele*, 684 F.2d 902, 910, 214 USPQ 682, 689 (CCPA 1982); see also *In re Ser-naker*, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed.Cir.1983). In view of our conclusion that claims 60 and 77 are nonobvious, the dependent "flame" claims are also patentable.

CONCLUSION

The Board's decision affirming the Examiner's rejection of claims 60, 62, 63, 68, 69, 77, 79, 80, 85 and 86 of Fine's application as unpatentable over the prior art under 35 U.S.C. § 103 is

REVERSED.

EDWARD S. SMITH, Circuit Judge, dissenting.

I respectfully dissent. I am of the firm belief that the prior art references, relied upon by the PTO to establish its *prima facie* case of obviousness, in combination teach and suggest Fine's invention to one skilled in the art. Also, I firmly believe that Fine failed to rebut the PTO's *prima facie* case. On this basis, I would affirm the board's determination sustaining the examiner's rejection, pursuant to 35 U.S.C. § 103, of Fine's claims on appeal before this court.



PETROCHEM SERVICES,
INC., Appellant,

v.

The UNITED STATES, Appellee.

No. 87-1382.

United States Court of Appeals,
Federal Circuit.

Decided Jan. 26, 1988.

Government contractor appealed decision of the Armed Services Board of Contract Appeals denying contractor's claim for equitable adjustment of contract to remove oil spilled on naval base. The Court of Appeals, Nichols, Senior Circuit Judge, held that Government's duty to disclose superior knowledge was not legally discharged by Navy supervisor's oral representations, unless contractor's representative heard and understood representations.

Vacated and remanded.

1. United States ¶70(30)

Disclosure of superior knowledge doctrine applies in situations where contractor undertakes to perform without vital knowledge of fact that affects performance costs